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The Action of Hypobromites on Cellulose and Its Application in Testing Cotton

By A. J. HALL, B.Sc., F.I.C., F.T.I.

SOME four years ago it was discovered by Clibbens and Ridge (J. Text. Inst., 1927, *18*, 143) that the oxidation of cellulose by solutions of sodium hypobromite was markedly different from that by means of sodium hypochlorite, and since then it has been found that oxidation with hypobromite can be very usefully employed as part of a method for determining the reactivity of cellulose. It is obvious that in technical processes connected with the cotton and rayon industries the reactivity of the cellulosic raw material employed is of considerable importance and that any means for evaluating this quality must be of the utmost value. In this article it is proposed to deal with the behavior of cellulose towards hypobromite in the light of the most recent investigations.

The reaction between cotton and a hypochlorite or hypobromite is obviously one of oxidation and must result in deterioration of the cotton according to the severity of the treatment. The extent of the reaction may, therefore, be measured by the various methods now in use for estimating the degree of deterioration (degradation) of cellulose. Among these methods those dealing with the Copper Number, Methylene Blue absorption, and viscosity in cuprammonium solution are of most importance.

It is first necessary to note that the behavior of cotton when immersed in a solution of a hypochlorite or hypobromite is intimately dependent on the acidity or alkalinity of the solution. In the case of a hypochlorite it is not true, as has in the past been supposed, that the effective action of this substance is continuously increased by addition of acid to the solution. It is, in fact, found that a hypochlorite solution is most active at the neutral point, that is, when the solution has a pH = 7; the addition of acid or alkali merely decreases its activity. This fact is excellently shown by the curve in Fig. 1 which represents the period of time required for bleach liquors of various pH to lose one-half of their active chlorine when in contact with cotton under comparative conditions.

In contrast, solutions of sodium hypobromite are much more active. They show similar oxidation effects, but in particular the hypobromite solutions are very unstable at the neutral point. This point may be illustrated by utilization of the fact that oxidized cotton has an increased affinity for Methylene Blue.

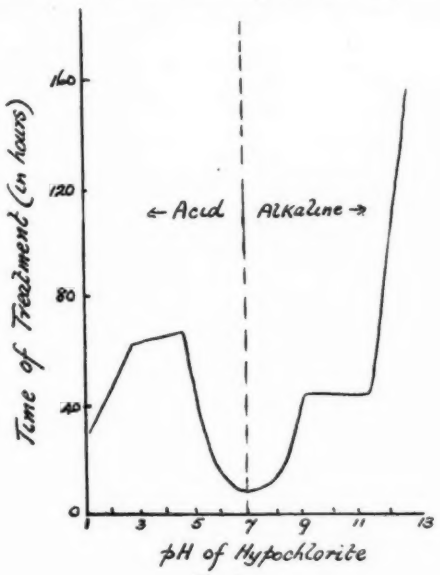

Fig. 1.

Fig. 2 shows the Methylene Blue absorption curves obtained by Clibbens and Ridge (*supra*) for cottons oxidized with alkaline solutions of hypobromite and hypochlorite, the hypochlorite solution being four times stronger than the hypobromite. Even with this considerable difference of concentration the Methylene Blue absorption increases very much more rapidly with the hypobromite solution.

Although neutral solutions of hypobromite are very unstable when in contact with cotton it is found that alkaline solutions react much more smoothly. An N/10 solution of caustic soda containing hypobromite is thus very convenient for oxidizing cotton under

conditions which it is desired to standardize. Since after such oxidation of cotton its Copper Number is increased it occurred to Birtwell, Clibbens, Geake, and Ridge (J. Text. Inst., 1930, *21*, 90) that the reactivity of cotton cellulose might be conveniently determined by oxidizing the cotton under strictly defined conditions and then determining the increase of Copper Number of the cotton thus produced as compared with that in the similar treatment of a standard pure cellulose. It would be anticipated that the greater the reactivity of the cotton cellulose being tested the greater would be its increased Copper Number as produced by hypobromite oxidation. This has proved to be the case and the above workers have standardized a procedure which is of much use to all concerned with cellulose.

It will be noted that this new test is really an alternative to the Schwalbe hydrolysis test (Zeitsch angew. Chem., 1908, *21*, 1321, and 1909, *22*, 197). In this the Copper Number of the cellulose is determined before and after boiling for 15 minutes with 5% sulphuric acid. The following results indicate the reactivities ("hydrolysis numbers") of a few different types of cellulose:

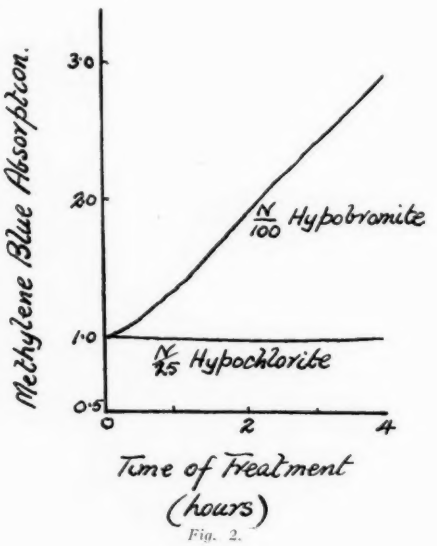

Fig. 2.

Cellulose	—Copper Numbers— Before Acid Treatment	After Acid Treatment	Hydrolysis Number (Reactivity)
Pure cotton	1.1	3.3	2.2
Pure cotton mercerized with 8% NaOH	0.9	3.2	2.3
Pure cotton mercerized 16% NaOH..	1.3	5.0	3.7
Pure cotton mercerized 24% NaOH..	1.2	6.1	4.9
Pure cotton mercerized 40% NaOH..	1.9	6.6	4.7
Cuprammonium rayon	1.5	12.8	12, 11.3
Viscose rayon	2.9	16.6	13.7
Chardonnet rayon ..	4.1	17.7	13.6
Mitscherlich unbleached pulp ...	2.4	4.4	2.0
Ritter-Kellner unbleached pulp	2.8	3.5	0.7

As might be expected, these results show that the more swollen is a cellulose the greater is its reactivity.

Certain disadvantages are attached to the Schwalbe test. For instance, the period of 15 minutes is comparatively short and it is found that any slight variation in this period produces considerable errors in the hydrolysis number. The conditions of boiling—whether vigorous or gentle—also have an influence. It is found that oxidation by hydrobromite is not so sensitive to small discrepancies in manipulation, and this is, of course, a marked advantage.

The method of carrying out the reactivity test and the solutions employed will now be described. The following solutions are required:

1. 2N. sulphuric acid solution.
2. 2N. caustic soda solution.
3. A bromate-bromide solution containing per liter 14.4 grams of potassium bromate and 60 grams of potassium bromide.

At least one-half hour (one day is preferred) previous to the tests, 200 c.c. of the bromate-bromide solution are placed in a liter flask and 200 c.c. of the 2N sulphuric acid solution added rapidly; the flask is then well stoppered. On standing overnight the following reaction continues to completion:

(1) $KBrO_3 + 5KBr + 3H_2SO_4 = 6Br + 3K_2SO_4 + 3H_2O$.

(2) $6Br + 6NaOH = 3NaOBr + 3NaBr + 3H_2O$.

To the contents of the flask (care must be taken not to allow the escape of bromine by unnecessary exposure to air) is then added with cooling 250 c.c. of 2N. caustic soda solution, whereby the bromine and alkali react to form sodium hypobromite. The solution is then diluted to one liter and is then very nearly N/10 in oxidizing power and N/10 in alkalinity. This solution is stable for about one day.

Oxidation of the cotton or other cellulose being tested is then carried out thus:

A 200 c.c. stoppered bottle is employed and into this is placed 100 c.c. of the hypobromite solution and 2.5 grams of the air-dry cotton. The mixture is allowed to stand with occasional shaking for 1½ hours at a room temperature of 20-25 C., or for 2 hours at a room temperature of 15-20 C. The mixture is filtered through a perforated plate, and the residual cotton thoroughly washed (1) with water, (2) with a dilute solution of hydrogen peroxide to decompose residual hypobromite, (3) with water, (4) with N/10 sulphuric acid, and finally with water till the cotton is neutral.

The residual purified cotton obtained as described above is pressed as dry as possible and then (without

drying) employed in the following test for determination of its Copper Number.

Firstly, 5 c.c. of a solution containing 100 grams of pure crystalline copper sulphate per liter and 95 c.c. of a solution containing 50 grams of sodium bicarbonate and 350 grams of crystalline sodium carbonate per liter are mixed, and the mixture raised to the boil in a conical flask of slightly more than 100 c.c. containing the wet cotton obtained as described above. After thoroughly mixing the cotton and solution the flask is closed loosely with a pear-shaped glass bulb and immersed for exactly 3 hours in a vigorously boiling water bath. The contents of the flask are then filtered at the pump, and the residual cotton (impregnated with cuprous oxide) is washed with dilute sodium carbonate solution and then with hot water in order to remove all soluble substances. Then the cotton is treated on the filter with successive portions of 15 c.c., 10 c.c., and 10 c.c. of an acid iron alum solution (100 grams of iron alum and 140 c.c. of concentrated sulphuric acid per liter) being finally washed with 2N sulphuric acid solution; all the filtrates are then combined and titrated with N/25 potassium permanganate solution. It is here noted that the cuprous copper dissolves in the iron alum solution simultaneously reducing its equivalent of ferric iron to the ferrous state; the amount of potassium permanganate required to oxidize this ferrous iron is thus equivalent to the reducing power of the cotton and allows the easy calculation of the Copper Number. The Copper Number is the number of grams of cupric copper reduced to the cuprous state by 100 grams of cotton.

The ratio between the Copper Number of the oxidized cotton as described above and the Copper Number of a plain standard bleached cotton is termed the "reactivity ratio." Strictly, this ratio is only a measure of the reactivity of the cotton towards hypobromite solution, but the evidence so far obtained indicates that it is also a measure of the reactivity of the cotton towards dyes, moisture, and other agents.

Birtwell, Clibbens, Geake and Ridge have carried out some very interesting investigations concerning the "reactivity ratio" of variously treated celluloses, but before dealing with these it is perhaps better to indicate how the conditions of the test as outlined above influence the result. It will be remembered that it has been mentioned that consistent results can be obtained even when the conditions of the test are slightly departed from.

The conditions which may affect the test are (1) concentration of hypobromite, (2) concentration of alkali, (3) temperature, and (4) time allowed for oxidation.

The following data indicate both the effect of a change of concentration of hypobromite within the limits 0.9 N/10 and 1.1 N/10, and also show how near are the results obtained when the conditions are constant.

Hypobromite Concentration	Copper Number				
1.099 N/10	1.67	1.65	1.69	1.69	Average 1.68
1.001 N/10	1.60	1.57	1.57	1.56	1.58
0.901 N/10	1.47	1.47	1.46	1.46	1.47

A change of 0.1 in the hypobromite factor results in a difference of about 0.1 in the Copper Number, but it is obvious that if the hypobromite factor is kept between 0.95 and 1.05 N/10 the results will be reliable.

The effect of varying the alkali concentration is seen by the following results to be very small, and a variation of concentration within the limits 0.9 and 0.1.1 N/10 is permissible.

Concentration of NaOH	Copper Number				
1.101 N/10	1.57	1.59	1.61	1.62	Average 1.60
0.997 N/10	1.57	1.53	1.57	1.58	1.56
0.902 N/10	1.64	1.61	1.58	1.58	1.60

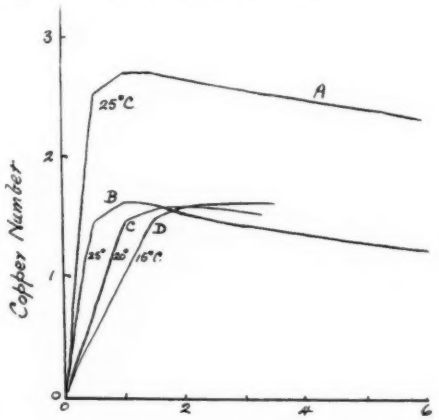

Fig. 3.

The effects of time and temperature in the test are interesting and are shown in Fig. 3. Curve A was obtained with mercerized cotton, while curves B, C, and D were obtained with the same cotton before mercerization at temperatures of 25°, 20°, and 15° C. The curious point is that the same maximum is reached at different temperatures, provided a longer time is allowed in the case of the lower temperatures. The curves show that moderate variations of time and temperature do not cause serious errors.

In view of the fact that the concentration of hypobromite appears to be the most important factor it is useful to note that a method for preparing the hypobromite solution which is more accurate than the one already described is available. In this method a solution is prepared of slightly higher concentration than N/10 so that it can be diluted exactly to N/10. To facilitate this procedure a flask similar to that shown in Fig. 4 is employed; it holds 1000 c.c. at level A and 1100 c.c. at level B. The hypobromite solution is prepared in this flask as previously described, ex-

cept that 220 c.c. of the bromate-bromide solution and 220 c.c. of the 2N. sulphuric acid solution and 275 c.c. of the 2N. caustic soda solution are employed instead of the quantities there described. The flask is filled to the 1100 c.c. level. Then 20 c.c. of the solution is titrated with N/10 sodium arsenite solution in the presence of 1-2 grams of sodium bicarbonate, starch-iodide paper being used as an outside indicator. In this manner is obtained the hypobromite content. In a second titration 2 c.c. of neutral 10-volume hydrogen peroxide solution is added to 20 c.c. of the hypobromite solution for destruction of the hypobromite thus:

$$NaOBr + H_2O_2 = NaBr + H_2O + O_2$$

and the alkali content then measured by titration with N/10 sulphuric acid using Methyl Red as an internal indicator. It is then possible to withdraw excess of the liquor from over the 1000 c.c. level and add the

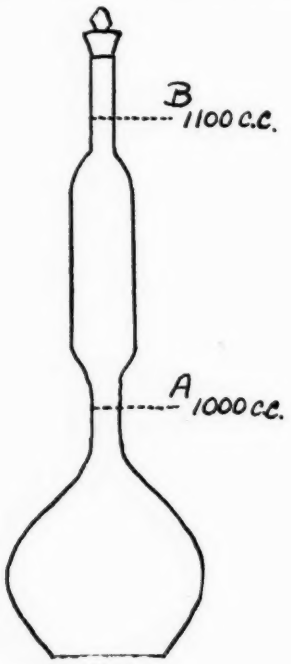

Fig. 4.

calculated quantities of water, caustic soda or sulphuric acid, to bring the solution to within the specified limits of hypobromite and alkali content.

Although in adding the sulphuric acid to the bromate-bromide solution it is preferable to allow the reaction to proceed for about 12 hours, no great error is caused by allowing but one-half hour.

For very exact measurements it is desirable to effect the oxidation at 25 C. for exactly one hour in a thermostat.

It is now possible to turn some of the interesting features discovered by application of this oxidation process. In the first place it has been found that the Copper Numbers of a wide variety of scoured and bleached cottons (not subjected to any swelling process) average about 1.5 after being oxidized by the standard hypobromite procedure. On the other hand, mercerized cottons, after similar oxidation, have Copper Numbers greater than 1.5. So that the reactivity ratio of a cellulose is C/1.5, where C is its Copper Number after the standard oxidation. For ordinary mercerized cottons this reactivity ratio is about 1.8 whereas for parchmentized cotton it rises to about 2.0. The reactivity ratio of a normal bleached cotton is obviously about 1.0.

The effect of a swelling treatment on cotton should be to increase its reactivity ratio. Such a treatment is the well known mercerization process in which cotton yarn or fabric is treated with caustic soda of about 55° Tw. Now it is generally found that this treatment gives the cotton a much increased affinity for direct cotton dyes, but that if the cotton is stretched in the process the increase of affinity is not so great. If therefore the reactivity ratio is able to indicate the degree of affinity of cellulose for a direct dye then stretched mercerized cotton should have a lower reactivity ratio than non-stretched mercerized cotton but that both should have a higher reactivity ratio than the cellulose before mercerization. The following results obtained by Birtwell, Clibbens, Geake, and Ridge confirm these surmises excellently; they were obtained by mercerizing 54 inch skeins of cotton yarn with 20½ caustic soda, some of the skeins being stretched to an increasing degree.

(*Continued on page 823*)

General Dyestuff Releases

Indanthren Red FBB, a product of the I. G. and imported solely by the General Dyestuff Corporation, is said to have very good affinity for the fiber and produce full red shades of very good fastness to light and weather and excellent fastness to washing, boiling soda and chlorine. I. G.-382.

Supranol Orange GS, a new homogeneous acid color, is said to give a very bright yellowish shade of exceptional fastness properties. The circular states that the color is of especial interest to printers, being easily soluble, quickly fixed on wool or silk and discharged to a perfect white. I. G.-410.

Indanthren Printing Red 3B Paste is a new vat color of a bright bluish shade. The circular states that it is remarkable for its easy fixation and very good fastness to light. It may be discharged to a perfect white with Rongalite C. L. I. G.-348.

Fastusol Red 4BA is a new fast to light direct color manufactured by the General Aniline Works and offered by their sole selling agent the General Dyestuff Corporation. It produces full bluish reds which are said to have excellent fastness to light. According to the circular, it dyes level, exhausts well and discharges to a pure white with Rongalite C. These properties make it suitable for combination shades, padding, machine dyeing or printing. G-61.

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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NOVEMBER MEETING OF THE RHODE ISLAND SECTION

The November meeting of the Rhode Island Section of the American Association of Textile Chemists and Colorists was held on Friday evening, November 28th, 1930, at the rooms of the Providence Engineering Society.

Richard B. Earle, Chairman, presided.

Mr. James G. Vail of the Philadelphia Quartz Company gave an interesting talk on "Silicates."

About forty-five members were present.

Respectfully submitted,

A. Newton Graves, *Secretary.*

SIXTY-SECOND MEETING OF THE RESEARCH COMMITTEE

THE Sixty-Second Meeting of the Research Committee of the American Association of Textile Chemists and Colorists was held at the Engineers' Club, Boston, Mass., Friday afternoon, November 21st, 1930, at 3:00 P.M.

The following were present:

L. A. Olney, Chairman; J. R. Bonnar, representing A. E. Hirst, Hugh Christison, Ralph F. Culver, Harry R. Davies, Dr. Carl Z. Draves, Walter C. Durfee, Henry D. Grimes, Walter E. Hadley, Dr. Jos. F. X. Harold, B. L. Hathorne, Henry F. Herrmann, Dr. E. H. Killheffer, Harold W. Leach, Geo. A. Moran, Dr. Hans Meyer, Dr. Walter M. Scott, Walter S. Williams, P. J. Wood, Alex. Morrison, Secretary.

Regret at inability to attend the meeting were noted from Wm. H. Cady, P. F. King-bury, Ed. F. L. Lotte, Claxton Monro.

An invitation from Dr. George K. Burgess, Director of the Bureau of Standards in Washington, D. C., to our Research Committee members, to visit the Bureau en route to or from Chattanooga, Tenn., for the Annual Meeting, was read. The Chairman was directed to acknowledge Dr. Burgess' kind invitation with gratitude, and to advise him that as most of the members will go through Washington at night it would be impossible to avail themselves of his hospitality.

The Chairman presented some 20 Research subjects being considered by the Research Committee of the U. S. Institute of Textile Research, of which he is a member. A great deal of time was spent in the discussion of these problems. Suggestions were made to the Chairman as to which of these problems would fit into our present research scheme with the idea of our research committee

co-operating with the U. S. Institute of Textile Research in the solution of these problems.

The consensus of opinion was that the list of subjects did not contain enough fundamental problems in the Textile Industry.

B. L. Hathorne, Chairman, Rayon Sub-committee, reported in detail on the work of his Committee, and showed that a great deal of progress had been made.

Dr. Carl Z. Draves reported on detail work he had carried out in connection with pH determination on solutions used in our fastness to perspiration tests as outlined by our Sub-committee on this subject. Dr. Draves pointed out that our acid solution shows pH much higher than that of perspiration as determined by our English colleagues. Methods of changing our solution were discussed. Hugh Christison, Chairman of Sub-Committee on Fastness to Perspiration, was in agreement with Dr. Draves as he had been checking this point recently and the Sub-Committee will make immediate change in the specification of the acid solution.

The pH of the alkaline solution used in this fastness to perspiration test was found to be 8.70, which is a trifle higher than that determined for perspiration and it was felt that the test should err on the severe side slightly. Consideration will be given this point however by the committee, but probably no change will be made at the present.

No other sub-committee had further reports to make.

The meeting adjourned at 5:30 P.M. to meet at Chattanooga, Tenn., December 5th, 1930, after the Council Meeting, which is scheduled for 11:00 A.M.

Respectfully submitted,

ALEX. MORRISON, *Secretary.*

SIXTY-EIGHTH COUNCIL MEETING

THE Sixty-Eighth Council Meeting of the American Association of Textile Chemists and Colorists was held at the Engineers' Club, Boston, Mass., Friday afternoon, November 21st, 1931.

The meeting was called to order at 2:10 P.M. with the following present:

President, E. H. Killheffer; Vice-Presidents, P. J. Wood, W. S. Williams; Treasurer, Harry R. Davies; Councillors, Hugh Christison, Ralph Culver, George A. Moran, Walter M. Scott; Councillors ex-officio, Prof. L. A. Olney, Chairman, Research Committee; Henry D. Grimes, Chairman, Northern New England Section; Carl Z. Draves, representing A. M. Burt, Chairman Philadelphia Section; Secretary, Alex. Morrison.

The Secretary's report of the Sixty-Seventh Council Meeting was read and approved.

The Secretary's balance sheet was read and approved as follows:

SECRETARY'S BALANCE SHEET—NOVEMBER, 20, 1930

Cash on hand October 30, 1930	$228.00
Receipts Oct. 31st to Nov. 19th, 1930, Incl.	
Applications, 12 @ $5.00	60.00
1930 Dues, 1 @ $5.00	5.00
1931 Dues, 404 @ $5.00	2,020.00
Year Book sales, 3 @ $3.00—1 @ $2.00	11.00
Pin, 1	1.50
	$2,325.50
Disbursements:	
11-14-30 To Treasurer—General Fund	$1,200.00
11-18-30 Exchange Charge	.10
11-20-30 To Treasurer—General Fund	1,000.00
Cash on hand Andover National Bank	125.40
	$2,325.50

The Treasurer's report for the year 1930 was read as follows and approved:

TREASURER'S REPORT FOR THE YEAR 1930

GENERAL FUND

Cash on hand Nov. 8, 1929	$6,106.60
Receipts Nov. 8, 1929, to Nov. 19, 1930, Incl.	7,973.97
Interest on $6,000 in Savings Account	229.61
	$14,310.18
Expenditures $7,250.53	
Transferred to Research Fund. 2,000.00	9,250.53
Balance	$5,059.65

RESEARCH FUND

Cash on hand Nov. 8, 1929	$2,487.16
Receipts Nov. 8, 1929, to Nov. 19, 1930, Incl.	2,971.82
Transferred from General Fund	2,000.00
	$7,458.98
Expenditures	3,818.98
	$3,640.00

BANK BALANCE

General Fund	$5,059.65
Research Fund	3,640.00
Balance	$8,699.65
First National Bank Checking Account	$2,268.44
First National Bank Savings Account	6,431.21
	$8,699.65

The following were elected as of date thirty days after publication of names if no objection is registered by any member.

Active

Morris Blackman—14 Fifth St., Fairlawn, N. J. Colorist, Textile Dyeing Co. of America, Fairlawn, N. J.

Sydney R. David—381 Clinton Road, Brookline, Mass. N. E. Manager, Sandoz Chemical Works, 36 Purchase St., Boston, Mass.

O. Goldschmidt—343 Graham Ave., Paterson, N. J. Salesman and Colorist, Somerset Aniline Works, Inc., Pluckemin, N. J.

Charles H. Knapp, Jr.—2139 Betts St., Frankford, Phila. Chemist, Collins & Aikman Corp., 4675 Nixon St., Manayunk, Phila.

Robert F. Lavender—4807 14th Ave., Chattanooga, Tenn. Dyer, Nick-A-Jack Hosiery Mills, Chattanooga, Tenn.

Elmer S. MacNeill—471 Smithfield Ave., Pawtucket, R. I. Color Matcher, J. & P. Coats, R. I., Inc., Pine St., Pawtucket, R. I.

Edward Novak—158 Main St., Little Ferry, N. J. Dyer, Bellman-Brook-Bleachery, Fairview, N. J.

A. S. B. Tata—Graduates' Lodge, Empress Mills, Nagpur, C. P., India. Dyeing Asst., Empress Mills, Nagpur, C. P., India.

Gordon M. Thompson—6 Argyle St., Andover, Mass. Chemist, Washington Mills, Lawrence, Mass.

Chris T. Wagner, Jr.—19 Center Ave., R. D. No. 2, Conshohocken, Pa. Supt. Dyeing and Finishing, Collins & Aikman Corp., Fountain St. and Canal, Manayunk, Phila.

Karl Wille—61 W. Main St., Somerville, N. J. Textile Colorist, Calco Chemical Co., Inc., Bound Brook, N. J.

Junior

Randolph Treadaway—Box 625, Wadesboro, N. C. Asst. Dyer, Wade Mfg. Co., Wadesboro, N. C.

Frank J. O'Neil—104 Lexington St., Lawrence, Mass. Laboratory Asst., Pacific Mills (Worsted Div.), Lawrence, Mass.

Edward H. Grayson—415 Pettigrue St., Greenville, S. C. Dyestuff Salesman, Newport Chemical Works, Inc., Greenville, S. C.

William Cameron—32 Hobson St., Methuen, Mass. Laboratory Asst., Pacific Mills, Worsted Dept., Lawrence, Mass.

Franklin D. Summers was reinstated.

It was voted that the President appoint an Auditing Committee to audit the accounts of the Treasurer and Secretary, and Hugh Christison, Chairman, Henry D. Grimes, and Walter M. Scott were appointed the Committee.

In a combination meeting of the Council and Research Committee, President E. H. Killheffer and Chairman Prof. L. A. Olney explained the connection between our Association and the newly organized U. S. Institute of Textile Research. It was pointed out that our Association was one of many similar organizations, representatives from which had united and formed the new Association for the purpose of carrying on Textile Research in a much broader scope than probably would be possible by any of the independent associations.

The U. S. Institute of Textile Research has started the organization of its Research Committee, and it is thought that certain of its research undertakings, which are along the lines of our own endeavors, will be referred to our Research Committee for solution.

The membership of the new Institute is open to Associations, like the American Association of Textile Chemists and Colorists, corporations, manufacturers, etc., as well as individuals, and it is hoped that many members of the A. A. T. C. C. will become members.

The final program for the Annual Meeting at Chattanooga, Tenn., was presented and discussed, and final arrangements completed.

The meeting adjourned at 3:00 P.M. until 11:00 A.M. Friday, December 5th, 1930, at Chattanooga, Tenn.

Respectfully submitted,

ALEX. MORRISON, *Secretary.*

NOVEMBER MEETING OF NEW YORK SECTION*

THE NEW YORK SECTION of the American Association of Textile Chemists and Colorists convened Friday evening, November 21, 1930, at eight-fifteen o'clock, at the Club Rooms of the Building Trades Employers' Association, 2 Park Avenue, New York, Mr. Robert H. Gaede, Chairman of the Section, presiding.

Following the reading of the minutes of the last meeting, and announcement of the Annual Meeting, the technical program proceeded, as follows:

Chairman Gaede: We have as our first item this evening a paper on, "The Use of Standardized Colors." We are fortunate in having Mr. Maerz as our speaker. He has spent a great deal of time on the study of color and has written quite a bit about it. I take great pleasure in introducing Mr. Maerz. (Applause)

Mr. A. Maerz: Mr. Chairman and Gentlemen: Before I make an official start I should like to express my appreciation of the invitation to come here tonight and the compliment that it implies.

* Although the paper by Mr. Hough was to a large extent demonstration, it was felt that the transcription of the discussion was of enough interest to be printed in full. The paper presented by Mr. Maerz was published December 8th.

I don't know whether your speakers as a general rule give extemporaneous talks or whether they read set papers. The trouble with extemporaneous talks is the danger of rambling and so far as I am concerned I know my own failings in that respect, so with your permission I will read my paper.

There are one or two points I am going to bring up that to the ordinary designer and colorist may appear a little bit heterodox in nature but at the same time those statements are not in any way offhand. They are the result of many years of study not only of the subject but of the practice of designers and colorists, so when I reach those points I should like to have you pay particular attention to them.

Mr. Maerz presented his prepared paper. (Applause)

Chairman Gaede: Are there any remarks or discussions on this paper? I am sure that Mr. Maerz will be glad to answer any questions which anybody may care to ask.

If not, we will proceed to our next paper.

Two months ago we had a very pleasant evening. We were given a treat by having the Colorscope described and demonstrated to us by Dr. Sheldon. Tonight we are to have another treat—a demonstration of a designing machine by Mr. Hough, of Wired Radio, Inc., and I think that we have some pleasant surprises before us. I should like to introduce Mr. Hough. (Applause)

Mr. C. W. Hough: Ladies and Gentlemen: Unfortunately part of our apparatus was so attractive to someone that it has been taken out of the building. However, we shall do the very best we can to give you a little entertainment and a demonstration of the machine as far as it has been developed.

A few words of history in connection with this machine may be of interest to you.

Our company, Wired Radio, Inc., is a subsidiary of The North American Company. The North American Company is a public utility holding company operating lighting and power companies in various parts of the country. We operate in some eight hundred communities—a number of large cities with their surrounding smaller communities.

For the last nine years we have been working on a system of broadcasting over our electric lighting lines, and we have it developed today to the point where we can send out three simultaneous programs over the lighting lines. To our subscribers we shall supply a small instrument at a low monthly rental which they can plug into any lamp socket in their home and by turning a switch can select any one of these three programs.

This has been very highly developed from the engineering standpoint and in our laboratory we are now extending this development to include Television, the transmission of talking motion pictures in color, and as part of our Television program development we have developed this color machine which originally was started as a development in connection with the color organ.

Our German friends have done a great deal in combining color with music. They find that eighty-five per cent of the leading musicians react to the same color on the striking of a certain note on the piano.

There are two men in this country who have done a great deal of work in this connection and I think it is pretty well conceded now that each of the eighty-eight notes on the piano is represented by a single color. It is a wave-length relationship. And I think we shall soon know exactly the proper color to associate with each note.

Our thought in that connection was this: that if we could set up a machine with a microphone which would listen to the music and in the machine have tuned circuits which would correspond, say, to the eighty-eight notes of the piano or the notes of a soprano, we might throw on a screen patterns in colors corresponding to the music. As a matter of fact we have partially succeeded in doing that, though it still requires a great deal of development.

But these highly-strung temperamental people who have this color reaction with music claim to hear the sound of the various color images we produce; they react to them as they would to a three, four, or five note chord on a piano or organ. That is one of the developments we are working on.

The use of this machine as a designing machine is quite a by-product and it may have no interest at all to you. Unfortunately, some of the more intricate things we cannot show you because our turn-table which makes the color images movable was stolen from the building this afternoon and there isn't another one in the world. So we shall be limited to still images.

I am putting in this little summary pattern to show you how the colors are built up. We have in the machine nine projectors on each of which are eleven different colors on a rotating color disc. Those projectors are focused at different points on the screen.

This shows a combination with three colors. Those colors are changing and as they overlap they make and give a different light effect.

That gives you the same thing with six colors, constantly changing, slowly, and making many more shades of colors.

Now we have the complete set of nine color discs. With each pattern in the machine, with nine projectors, eleven colors on each projector, all running at different speeds, we get four and a half trillion different combinations of each pattern, and it would take hundreds of lifetimes to see them all. They keep changing forever as a matter of fact.

This pattern is put in just to show you the relationship of the nine projectors. We will turn off now all but one lamp, showing you the basic patterns, and then build it up right through from the single pattern.

That is just a cut-out piece of paper, one projector illuminating it. And as we add different projectors it builds up the complex pattern. All of the projectors are on universal joints, so that they may be shifted in focus to overlap more or less, and by shifting our viewing screen, the patterns can be changed by overlapping.

That is just to give you an idea of the mechanics of the machine (shifted screen).

These are combinations of three colors with vertical stripes. That is paper pasted on clear glass, just vertical strips. By changing the focus the stripes can be made to overlap in various combinations. Almost an infinite variety of stripings can be secured. This is simply a three-color one.

Suppose we put on a few more colors.

A change in focus.

I have sometimes thought that some of these wider ones might be used for awning materials, and that the smaller stripings might have some practical use. Of course these are the very simplest patterns that we can show.

This shows the same in a diagonal striping.

This shows some of the effects which can be secured.

Again, a change in focus changes the pattern. An increase in the number of lights makes it more and more complex.

At any point where it is desired to stop a design for an examiner or reproducer we have a switch so that we can stop and examine it or we can make very slow changes. For reproducing them the lamps are turned off and we insert photographic plates, turn on one lamp at a time, get the exposure and in that way we get offset printing plates that can be used directly from the fifteen-inch square pattern that we have here.

Some of the smaller plaids are quite interesting.

Again a change in focus changes the design, and a change in the lighting and a change in the color changes the design.

As these are going through I shall be glad if any of you who are interested in asking questions will do so because it is only by knowing what is in your minds that I can make this of the most interest to you.

This particular lighting is rather interesting. Those black horizontal lines are showing because the three lamps which happen to be on now are on a horizontal plane, so you get a direct black shadow. As we put on rows of lamps in a vertical plane in the machine you will see the black line disappear. It is on the other way now. Then as we put on lamps in the diagonal plane, we get rid of the black color again. That is almost a pattern of small rectangles, but by changing the focus it resolves itself into plaids of various kinds.

Ingenuity is involved in making up basic designs. I don't think the machine has any limit, except in the ability of the user to be ingenious in devising different patterns.

We have here some punched metal. It is aluminum radiator covering, I think. We will put one of those in on a horizontal plane and the other on a vertical plane and it is quite interesting to see how these patterns build up. A slight movement of one or the other of the plates entirely changes the pattern. A change in focus changes it. Placing the screens in a different plane gives an entirely different effect.

I should like an expression of opinion from some of you as to whether or not these patterns have any value in the textile industry. We don't know. It has been suggested that they may have. And there seems to be really no limit to the combinations that can be secured in pattern and color, always remembering however that there are only nine different colors in any of these designs. But we seem to get so far as I know practically all the colors, because they come through in such mixtures.

Mr. Maibach: Have you a flower stencil?

Mr. Hough: Yes, we have some natural flowers that I shall put in in a little while.

In our attempt to use this machine as a device for creating Television designs for transmission with our music we attempted to use rolls which are nothing more or less than player-piano rolls.

Here again we have a simple cut-out pattern. A change in focus changes the overlapping of the design and completely changes the pattern. We hope to be able to send out programs of this kind, not as crude as this, but along this line, with music, and we hope they will be attractive enough so that people will sit and look at them. Of course these are the first simple attempts to create designs for transmission over wires.

The addition of a simple screen to this gives the effect of motion.

By superimposing two series of patterns, one behind the other, we get another very curious effect.

Chairman Gaede: Will someone volunteer to answer Mr. Hough's question as to the practical value of this machine for designing purposes?

Mr. Hough: I think perhaps the gentlemen will be interested in the flower design which we will show you now and then we will have a forum of questions and answers, when this roll is through.

This pattern is fifty cents' worth of Woolworth's flowers, and I find they are just as good as if they were real flowers, for this purpose.

There you have a basic pattern of flowers in silhouette with one colored lamp behind them. Now we will build them up.

You notice the black shadow, the direct black shadow, and the flowers are gradually disappearing as you get cross-lighting from the various projectors, until finally as we build up the color to the maximum we get more and more pastel shades. Unfortunately the piece of apparatus which was lost this afternoon was a turn-table on which we could put these flowers and other objects and it revolved slowly so the pattern changed continuously. It is quite difficult to arrange them by hand. It is really almost by chance that you get a good arrangement of the flowers.

Now we shall put in the vase of flowers that we took from the dining-room this evening.

Mr. Maerz: There is only one trouble about using that as a source of design, Mr. Hough, and that is that the designer would be so interested in watching the beautiful effects he would forget all about taking his effects off of it.

Mr. Hough: I find that it is quite interesting to stop the machine and look at the pattern. And we certainly don't like that one.

Mr. Maibach: Can you keep the same background as you change the color, say, keep it black, and keep on changing the colors?

Mr. Hough: Yes, for example, we change it in very slight steps.

Mr. Maibach: Could you get a black?

Mr. Hough: Not a black background. No, we can't do that without making a cutout of the flowers. Now we have a black and white.

Mr. Maibach: But you couldn't keep a black ground and make the colors change?

Mr. Hough: Yes. I will explain in just a moment how that is done.

That is our basic pattern. We would be required to cut out what is now black and have a black paper pattern of what is now yellow, just the reverse of this. Then putting it in the machine we would have yellow flowers and a black background.

Mr. Maibach: But could you always keep that black background and continuously change the colors?

Mr. Hough: Yes.

Will you give us three lamps in horizontal position?

You will notice with three horizontal lamps the pattern tends to spread out over the frame. It is very much simpler than it was before and the colors seem to be more brilliant although as a matter of fact they are not so brilliant as they are when all of the lamps are on.

Now instead of three horizontal lamps we will put on three in a vertical row and you will see that the pattern seems to grow vertically.

Mr. Schwab: Could you put on two or three prints?

Mr. Hough: Yes, we can give you any combination.

With this particular pattern which I think is satisfactory for this experiment we will turn all of the projectors to green——

Mr. Schwab: Can you separate the flowers and the leaves? Can you show just one flower?

Mr. Hough: Yes, that can be done. Each of the little projectors is a motion picture projector and we can use those individually, and superimpose the photographs on motion picture films or small stencils. Here we are throwing all of the light through a single stencil and we can give you flowers of different colors as you see there. There we have a green flower. There is red. There is blue and red. Where they overlap the lights cut off into black. I think it would be too complex to separate individual flowers into separate colors. But I should like to show you a green background with all the projectors turned to green.

The pattern now is very diffuse, all in green. It is perhaps too light in color. We will reduce a little by turning off three projectors.

The predominating color here is green. Two colors are changing. It is quite a different combination from the former one where all of our colors were changing.

In these flowers, if you will notice, the individual flowers take on a different color from the adjoining colors and from the background.

Mr. Frank: You couldn't grade all those tones into one tone, giving a sort of monotone, could you?

Mr. Hough: I am afraid I don't know enough about colors——

Mr. Schwab: He means part of it in light green, the next part a little darker green, and the third part a very dark green.

Mr. Hough: That would depend on the colors in the color discs. I believe we have more than one green. The greens I gave you just then were all the same green.

Those are blues and greens, aren't they?

Mr. Frank: Could you change that just as it is to reds, for instance?

Mr. Hough: Would you like them all red, reds of various shades?

Mr. Frank: I mean blues, red greens, and so forth.

Mr. Hough demonstrated this on the machine.

Mr. Schwab: Could you take out that big flower and demonstrate it alone? Can you take all the rest of them out and just demonstrate that flower?

Mr. Hough: What do you want me to do?

Mr. Schwab: Instead of having the bunch, have one flower alone, a simple design. That is too complex as it is.

Mr. Hough: That is the simple flower.

That is simply a shadow produced by the light beam shining past the flower on to the screen, giving that red, because there is a red screen over the lantern. As we add lamps, all we will do is shift this shadow and make another shadow of the same kind in any one of nine places around there, either diagonally, vertically, or horizontally.

As additional lamps are lighted, the intensity of the light is apparently decreased.

Mr. Schwab: Can you hold it?

Mr. Hough: Yes.

Possibly you would like to see one or two more of the rolls of cut-out patterns and then we can shut down the machine.

There is the individual pattern. We will now build it up.

This is very complex when it is built up.

Mr. Frank: Could you change those colors?

Mr. Hough: We could stop some of the projectors; that is, we could select the colors and stop the projectors.

Mr. Frank: Like you have it now, with three, just keep changing the three colors—can you do that?

Mr. Hough: Yes, there are three changing.

Mr. Harris: Could you also for instance have three colored lamps showing three different shades of red?

Mr. Hough: Yes, Mr. Harris, we can do that.

To use this in a designing machine, you would want colored discs of each color, with graduated colors around the compass of the discs, so that you could get any combination of colors that you might want.

Mr. Harris: Could that be done with this?

Mr. Hough: Yes, we have discs of that kind. As a matter of fact the Newport Company made up some discs in which there were twenty different colors, and they were remarkable. They are not so interesting in a demonstration of this kind. They are more a matter of color-matching and build up a pattern that you have in mind before you start, really.

Mr. Maibach: Suppose you select that pattern as one that you would like to have engraved or reproduced on goods. Could you send that plate to the engraver, or would he have to engrave from that plate?

Mr. Hough: I am not a technician in that respect——

Mr. Maibach: Suppose you wanted that pattern. You would stop the machine and it would have to be arranged. You couldn't use it the way it is. You would have to have it arranged by an artist.

Mr. Schwab: Am I right in assuming that you have to have it arranged so that you can photograph not only the design as a whole but each individual color, so that you have as many photographs as there are colors in the design? In other words, you have a series of photographs just as the engraver has a series of plates from which he makes a decolor.

Mr. Hough: Let us take the design that is on the machine at the moment.

This design is built up of nine colors. We will turn those out now, down to one. That is our basic pattern.

Now we wish to reproduce this for printing on paper, for example. I should remove this color disc, and I would photograph that with an ordinary camera. Then I would turn on the next lamp. That is the correct offset for the next printing plate.

Mr. Schwab: That would be the blue element.

Mr. Maibach: You would have to make nine photographs.

Mr. Hough: You would have to make nine photographs if you wished to print the nine colors.

Mr. Berry: Your arrangement there wouldn't be correct because you would have blues all on one side and the——

Mr. Hough: Will you turn them all on now?

Mr. Berry: Now you are getting them.

Mr. Hough: It will be just like that, sir.

Mr. Frank: That wouldn't be a practical idea for the arrangement of colors. Could the colors be arranged differently so that the reds which are all on one side, for instance, would be partly on the other side?

Mr. Hough: The reds happen to be on that side now because of the position of the wheels. By turning the disc I think you can put the red wherever you want it.

Mr. Berry: You could put part of it on one side and part of it on the opposite side.

Mr. Hough: It is really possible to arrange the basic patterns in any one of the nine positions in any color that you wish.

Mr. Frank: For instance, could you take those blues and shift them up to the corner—not all of them, but just one?

Mr. Hough: We will try to do as you suggest. Just turn one on.

That is the pattern. If you wanted those little figures—they look like dolls—arranged in some different location on the paper it would be necessary to have your artist arrange the original pattern in that way. Then that lot would always take the same color. The other lots which come from different projectors would be in the other colors. But I think it is a task for the artist to arrange where to put the figures in the design.

Mr. Frank: It depends on how the stencil is cut?

Mr. Hough: Yes.

Mr. Maerz: Here is a technical point that I think ought to be brought out in connection with some of these questions.

So far as the matter of making pretty plates direct from your machine is concerned, we have an example right there that I should like to call to your attention. You might think you could make printing plates by your photograph plates right here from the machine. If you did that, you would get an entirely different effect from what you see in your printing plates.

Mr. Hough: Because of matching on the edges?

Mr. Maerz: If you have a blue and yellow, a pretty plate, crossing each other on a piece of textile, you get green, but in this machine blue and green crossing each other produce pure white.

Mr. Hough: You have an example of it there.

Mr. Maerz: So that green would be entirely different from what you get in a printing plate. In other words if you saw an effect in the machine and wanted to get the design in a textile your artist would have to copy the thing direct.

Mr. Hough: We have been successful in using orthochrome plates in copying these designs and my thought is that possibly that would be the way of reproducing them, if it is desirable to do so.

Mr. Maerz: That would be an excellent way.

Mr. Berry: May we see the original of that polka dot design?

Mr. Hough: It is very simple.

Mr. Frank: Would you hold that a moment, please? Could you take that as it is and reduce it in size and still have same colors as there are on your screen?

Mr. Hough: Do you mean that (demonstrating)?

Mr. Frank: Yes. Are the colors in the same respective places as they were before?

Mr. Hough: Yes.

Mr. Frank: The design is changed, though.

Mr. Hough: The design is changed because it is pressed from all sides.

Mr. Frank: Now focus it differently.

Mr. Hough: That is a very good point, sir, because as you change the focus you overlap the various sections of the design very much more than when it is enlarged, so that in every position of the screen you really get a different design, and if you wanted to reproduce a design just as you see it, it would have to be done by making colored printing plates from it.

Mr. Burns: Can you change the relative position of the projectors?

Mr. Hough: Yes, they are all on universal joints and the overlapping or compressing of the pattern can be adjusted by changing the direction of each projector. The limit there is that you can't change the projectors from their present position very much, otherwise the frame of the projector cuts into the side of the pattern. In other words, the rectangle which is the focusing frame of these small projectors at this distance is not very much larger than a fifteen-inch plate. That would be a very easy matter to arrange however by having this focusing plate moved out very much farther away from the projector.

Mr. Hough then showed some more patterns in his machine. (Applause)

Mr. Hough: I will be glad to have any of you come up and look at the machine and if you want to ask any questions you are welcome to do so.

Chairman Gaede: Are there any further questions that any gentleman would like to ask?

Before we adjourn to examine this machine I should like to ask for a rising vote of thanks to Mr. Maerz and Mr. Hough.

A rising vote of thanks was extended to these gentlemen. (Applause)

The meeting thereupon adjourned at ten-fifteen o'clock.

PARENT ORGANIZATION TENTH ANNUAL BUSINESS MEETING

THE Annual Business Meeting of the American Association of Textile Chemists and Colorists convened Saturday afternoon, December 6, 1930, at two twenty-five o'clock, at The Read House, Chattanooga, Tennessee, Dr. E. H. Killheffer, President, presiding.

President Killheffer: Gentlemen, we will come to order.

We will ask first for the annual report of the Secretary and following that of the Treasurer, and I will ask Mr. Davies, the Treasurer, to give us both reports, in the absence of the Secretary, Mr. Morrison, because of illness.

Mr. Davis read the following report of Secretary Morrison:

Secretary's Report

December 6, 1929, to July 1, 1930

Again it is very gratifying to be able to report that our Association is maintaining its steady healthy progress.

Since our Annual Meeting in Philadelphia on Decem-

ber 6-7, 1929, the Council and Research Committee have each had four meetings as follows:

February 14, 1930—Engineers' Club, Boston, Mass.
March 21, 1930—Chemists' Club, New York, N. Y.
May 1, 1930—Engineers' Club, Boston, Mass.
June 27, 1930—Engineers' Club, Boston, Mass.

The following numbers were elected to the different classes of membership:

Active	92
Junior	36
Associate	14
Corporate	2
	144

There were two reinstatements, not counting a number who were reinstated after suspension for about a month because of non-payment of this year's dues.

There have been the following suspensions because of non-payment of dues:

Active	65
Junior	27
Associate	4
Corporate	1
	97

It is quite likely a large number of these will be reinstated before our Annual Meeting.

Fourteen active members, three junior members, and one corporate member have resigned, and five members have died. This makes a net gain to date of 26 members. This number will undoubtedly be increased by the time of the Annual Meeting as applications are continually coming in.

A new Junior Section known as the North Carolina State College Junior Section was organized at the State College, Raleigh, North Carolina, June 6, 1930.

The classification of the membership as regards occupation and geographical location will appear with the list of members the same as last year as at this early date the new list of members is not compiled.

The foregoing report was written for the Year Book in July, 1930. Since that date the Council has had four meetings:

September 26, 1930—Engineers' Club, Boston, Mass.
October 31, 1930—Wool Club, New York, N. Y.
November 21, 1930—Engineers' Club, Boston, Mass.
December 5, 1930—Read House, Chattanooga, Tenn.

The following members were elected to the different classes of membership at these meetings:

Active	28
Junior	14
Associate	8
	50

Seven members were reinstated at these meetings.

Since July 1 we have had seven resignations take effect. The total membership at present is as follows:

Honorary	1
Active	1,086
Junior	160
Associate	53
Corporate	35
Total	1,335

Since July 1 the Research Committee has had three meetings:

September 26, 1930—Engineers' Club, Boston, Mass.
November 21, 1930—Engineers' Club, Boston, Mass.
December 5, 1930—Read House, Chattanooga, Tenn.

"Respectfully submitted,
ALEX. MORRISON, *Secretary.*

Mr. Davies: Then we have the Secretary's balance sheet as of December 2, 1930:

Cash on hand 11/20/30	$ 125.40
Receipts November 20 to December 2, 1930, Incl.	
Applications 5 @ $5.00	25.00
1930 Dues 1 @ $5.00	5.00
1931 Dues 152 @ $5.00	760.00
Corporate Dues 3	200.00
Atlas Electric Devices Co. 11/28 4 Launderometers	44.00
	$1,159.40
Disbursements	
12/2/30 to Treasurer—General Fund	$ 800.00
12/2/30 to Treasurer—Research Fund	244.00
11/20/30 Check Returned—Bank closed	5.00
11/25/30 Check Returned—Bank closed	5.00
Cash on hand Andover National Bank	105.00
	$1,159.40

Mr. P. J. Wood: I move the Secretary's report be adopted.

The motion was regularly seconded and carried.

President Killheffer: We will now listen to the Treasurer's report.

Mr. Davies presented his report as Treasurer for the year 1930, as follows:

Treasurer's Report

GENERAL FUND

Cash on hand Nov. 8, 1929		$ 6,106.60
Recepits Nov. 8, 1929, to Nov. 19, 1930, Incl.		7,973.97
Interest on $6,000 in Savings Account		229.61
		$14,310.18
Expenditures	$7,250.53	
Transferred to Research Fund	2,000.00	9,250.53
Balance		$5,059.65

RESEARCH FUND

Cash on hand Nov. 8, 1929	$ 2,487.16
Receipts Nov. 8, 1929, to Nov. 18, 1930, Incl.	2,971.82
Transferred from General Fund	2,000.00
	$ 7,458.98
Expenditures	3,818.98
Balance	$ 3,640.00

BANK BALANCE

General Fund	$ 5,059.65
Research Fund	3,640.00
Balance	$ 8,699.65
First National Bank Checking Account	$ 2,268.44
First National Bank Savings Account	6,431.21
	$8,699.65

President Killheffer: You have heard this report, gentlemen. What is your pleasure?

Mr. Walter H. Zillessen: I move it be accepted.

The motion was duly seconded and carried.

President Killheffer: Under Reports of Committees the most important Committee of course is the Research Committee and in the hope that more of our members may come in I think we will just defer that report for a moment or two longer and instead I shall report for a special committee that was created at our last Annual Meeting in Philadelphia.

Research Conference Committee

The committee was a Research Conference Committee, its purpose being to confer with similar committees representing other associations over the country all of whom had evidenced some interest in textile research. The thought was that by bringing all these bodies together we could all pull in the same direction instead of in opposite directions and the chances for really accomplishing something would be a great deal better. I shall probably say a little more about it this evening, but that was the purpose for which the committee was created.

At the time of its creation, the resolution creating the committee also called for an appropriation of one thousand dollars for necessary expenses of that committee. The committee expended nothing as far as the Association's funds were concerned but we did call a series of meetings with committees representing other associations and, briefly, the outcome of those conferences was the recent organization of the United States Institute for Textile Research in which body we now have tied in the interest we think of all associations, ours with the others, and in fact ours in a predominant manner because we, I think, without question, exerted more influence than any other single body both in the creation of the United States Institute for Textile Research and in the idea of its creation, in the first place.

That therefore is the report of that committee and its work being accomplished I think it is in order for it to be discharged.

At the same time the committee thought it advisable to recommend to the Association, and in fact did recommend yesterday at the Council meeting, and have the Council's approval, that the Association should now use the thousand dollars that was originally appropriated for the committee's expenses for the purpose of taking out a life membership in the United States Institute for Textile Research.

The committee further recommended that in taking this life membership of one thousand dollars that we specify that it is to be placed in the permanent fund of the United States Institute. That means they cannot use the thousand dollars for current expenses but can only use the income from it.

Inasmuch as the Institute's need at the moment is more for current funds than for permanent ones it was further recommended that for this one year only we also take out a contributing membership of one hundred dollars, making a total of eleven hundred dollars the amount of the financial participation of this body in the United States Institute for Textile Research.

That is the recommendation of your committee.

Mr. P. J. Wood: I move the recommendation be adopted.

The motion was duly seconded.

President Killheffer: It is regularly moved and seconded that the recommendation of the committee in regard to membership in the United States Institute for Textile Research be adopted. Is there any discussion on the motion?

The motion was put to a vote and carried.

President Killheffer: Dr. Olney, would you like to report for the Year Book Committee, first?

Year Book Committee

Dr. Louis A. Olney: I have here the complete galley proofs of the 1930 Year Book, and it will be considerably larger this year than it has been in previous years. Unfortunately however the amount of advertising this year is running somewhat lower. We presume that is due to the current depression in business and we all hope next year for better business and that this deficit in advertising will all be made up another year by renewal of old subscribers, and new ones in addition.

This Year Book has been very carefully gone over and revised in every way and the committee has every reason to believe that it will be the most accurate book that we have published up to the present time.

I think I can guarantee that you will all get your copy sometime this month. It is in the hands of the printer at the present time.

We trust that you will all get value from it and find it

a ready reference book in every way. I shall make further reference to certain features of the Year Book when I report in regard to the Research Committee.

The matter of changing the date of publication has been taken up and while it will make no difference this year it has been thought advisable another year to publish the Year Book in February rather than December because that will give an opportunity to bring more up-to-date reports into the Year Book than is possible under the present scheme.

For instance this Year Book cannot possibly carry the present Treasurer's report and the present Secretary's report. Neither can it carry any special changes or resolutions that are passed in regard to our standard methods for dye testing. By publishing the Year Book in February it will be possible to include quite a little of this type of material that always develops at the Annual Meeting.

President Killheffer: I don't think the report of the Committee on Year Book requires formal action of any kind, so that we can pass on to the next order of business.

In Memorial

I wonder however if we might not at this time stand in silence for one moment as a tribute to those of our members whom we have lost this year. They are:

William Caffrey
Clarence N. Cone
Jokichi Takamine
Dr. Berthold Wuth
J. C. Watson

The members stood in silent tribute to those members who died during the year.

Telegram of Sympathy

Mr. Hadley: Mr. President, I should like to make a motion that a telegram of sympathy be sent to Alex Morrison who I understand is in the hospital recovering from a very serious operation. The telegram I suggest will read:

"Alex Morrison
"5 Canterbury St.,
"Andover, Mass.
"The membership of the Association miss you much and send you their earnest wish for a speedy recovery."

Mr. Walter H. Zillessen: I move that the telegram be sent as offered.

The motion was duly seconded and carried.

President Killheffer: Now, Dr. Olney, may we have the report of the Research Committee?

Research Committee Reports

Dr. Louis A. Olney: During the past year the Research Committee has held seven meetings and there has been an average attendance of between twenty and twenty-five. The meeting held yesterday was the sixty-second consecutive meeting of the Research Committee.

There will appear in the 1930 Year Book which I have assured you you will receive some time this month, the complete report of the Research Committee which constitutes this year together with the various sub-committees something over eighty pages. So you see it would be rather hopeless to go into all that at this time. I shall therefore endeavor only to speak of a few of the important developments and future plans of the Committee and call upon the chairmen of such sub-committees as may be present to make reports in regard to the work of their individual committees.

There are in all sixteen sub-committees which are working under the direct counsel and supervision of the General Research Committee. The chairmen of all these committees are not here this afternoon but we have a few of them with us, and it may be well to simply go through these various sub-committees so that you may know what they are, and the work they are doing. If the chairmen are here we will ask them to say a few words, and I will make certain comments for some of those who may not be present.

Before calling on these various committees, I will present one matter which the Research Committee has been considering for some time and that is the adoption of certain of the tests which have been recommended as official methods of the Association. There are a few of these tests which have appeared in the Year Book for several years. No one has criticized them and for that reason we assume that they are acceptable to the Association. The special tests to which I refer are fastness to Acids and Alkalies, Fastness to Carbonizing, Fastness to Rubbing and Crocking, fastness to Sea Water, and the recommendation by the Light Committee of the Sun Test. I shall ask Mr. Cady later when he reports for his sub-committee to speak of the sun test. But at the close of this report I am going to recommend that, if it is the desire of the Association, we accept the methods for testing fastness that I have mentioned as being official tests of the Association.

There are one or two others that we will speak of and ask you to adopt but not as official methods because we believe that they need a little more study and an opportunity for further criticism on the part of the members of the Association.

The first sub-committee is the one on Fastness Tests for Dyed Silk. I have asked Mr. Appel to make the report of this committee in the absence of Dr. Walter M. Scott, the Chairman. Mr. Appel has worked very closely with that committee and Mr. Smith, our Research Associate, who is at the present time working at the Bureau of Standards in Washington has done quite a little of the testing in regard to this particular work. This is the first committee that has actually produced standard dyed samples for distribution to the Association. (At this point Prof. Olney exhibited the four standard dyed silk standards.) Mr. Appel will say more about these but I will simply mention that these have been made under the

recommendation of the committee. The silk has been dyed in the yarn and woven into the cloth and each sample, four by eight inches, represents one of the four different classes of fastness. It is proposed to make these up into the proper form and sell them to members of the Association and others who are interested, for a dollar a set.

I will ask Mr. Appel to report at this time.

Mr. William D. Appel: I should like to explain but I am not a member of this committee, though I am very glad to read you Dr. Scott's report, which is as follows:

At a meeting of the Research Committee on December 6, 1929, this sub-committee was authorized to produce standard dyeings of the four dyestuffs which have been selected as representative of the four classes of fastness to washing on silk. These dyeings are as follows:

Class I 5 Per Cent Ciba Blue 2 B Powder.
Class II 2 Per Cent Erio Chrome Azurole B.
Class III 2 Per Cent Wool Violet 4 B N.
Class IV 2 Per Cent Patent Blue A.

"It was decided to produce a fabric composed entirely of yarn-dyed spun silk; the warp to be 30-2 Spun Silk, C grade, 24,000 ends, 66-1 reed; the filling to be also 30-2 Spun Silk C grade, with 56 picks. The width of the finished cloth is 36 inches. The silk was spun and dyed at Cheney Brothers in accordance with the directions published in the 1929 Year Book of our Association. The cloth was woven on the looms of the Lowell Textile Institute. A total of 50 yards of each color was produced.

Samples of each dyed standard have been furnished to the United States Bureau of Standards. Through the courtesy of the Director of the Bureau a permanent record will be made of the color of each standard as produced and also of the alteration in color during each of the four standard washing tests. This work will be carried out under the supervision of Mr. William D. Appel, Chief of the Textile Section of the Bureau.

At a meeting of the Research Committee on September 26, 1930, it was voted to cut these standards into swatches 8 inches long and 4 inches wide, and to establish a price of one dollar for a set of four swatches, one of each color. The Secretary of our Association is to have charge of the sale of these standards. They will be placed on sale as soon as the official report of the Bureau of Standards is received.

With the completion of these silk standards, the committee feels that the subject of the fastness to washing of dyed silk has been thoroughly covered. We therefore offer the following motion for action at this Annual Meeting of the Association:

RESOLVED, That the American Association of Textile Chemists and Colorists adopt provisionally the standard tests for fastness of dyed silk to Domestic Washing and Laundering which will appear under Group S-1 in the 1930 Year Book of this Association, and that the dyed silk samples prepared by the silk sub-committee be adopted as the provisional standards of the silk-washing-fastness classes.

Respectfully submitted,
WALTER M. SCOTT, *Chairman.*

The reason for not recommending these as official standards at this time is that there still may be some need to change them. I have here the standards. This is the Patent Blue, the standard of Class IV, and this is the way it behaves in the four different treatments. To be in Class IV a sample must be as good as this standard. If it isn't it goes into the lowest class, Class V.

Here is the standard for Class III—the Acid Violet, showing the way it behaves in the tests.

Here is the standard for Class II, the Erio Chrome Azurole, and finally the Ciba Blue 2 B. If any of you are interested in looking at these closely, they will be here.

Of course, the notable forward step here is the matter of placing in the hands of all testing laboratories samples, pieces of the same identical fabric, for use in determining fastness.

Dr. Olney: Before we take any action at all in regard to this I wish to explain still further the situation which exists.

You may remember that at the beginning of my remarks I said we were not ready to adopt these methods as yet as being official. We feel however that these standards should be put in the hands of those who are capable of trying them out thoroughly, in order that we may if possible locate either additional dyes for this series or if necessary change some of those that we have.

As Mr. Appel has already explained, the criticism that has been made of these samples is that the Number I and Number II are too near together, also III and IV, and that there is too wide a gap between II and III. In this connection however I can say that the committee for, if I am not mistaken, about three years has been endeavoring to locate other dyes that would answer the requirements in a more satisfactory manner and as yet have been unable to find any. Meanwhile criticisms have been made, but as far as we know, none of the critics has been able to suggest dyes that were any better suited.

The question which you are to consider at this time is whether we should delay entirely sending out these samples for the purpose that has been mentioned—having them tried out—or whether we should absolutely hold onto them until we have had a further opportunity to study into the matter.

Mr. President, I think that matter is one which might well be opened to discussion.

President Killheffer: You have heard the remarks of the two speakers as to the advantages and disadvantages of this set of samples as prepared. Is there some further discussion? There is a question involved here of course

as to just what the Association wants to do and it was discussed some in the Council yesterday because, as it is perfectly obvious, the Association doesn't wish to, on the very first set of samples, standard samples if you please, that it sends out, invite undue criticism. That would seem to be unwise. On the other hand as has been pointed out they have been unable after a number of years of search to find the ideal gradations of fastness, using various of the known dyes. Whether the thing to do is to put this out as a provisional standard method instead of an official standard method and in that way get some further criticism, or whether some other way is the wiser method to handle it is something on which we would like to have your opinion. I am just a bit afraid, myself, that if we put out a set of samples and charge someone a dollar for them he will expect those samples to be definite standard samples. I may be entirely mistaken about that, but we would like to hear some expressions of opinion.

Mr. Wood, what do you think about this?

Mr. P. J. Wood: I think we could very safely adopt them as provisional types of four degrees of fastness with the expression that it is the best the Association has been able to find up to the present, but I wouldn't send them out as absolutely final types.

President Killheffer: Is there any further discussion? If not I think a motion is in order that we adopt them as the provisional standards of the Association.

Mr. Wood: I so move.

. . . The motion was regularly seconded. . . .

President Killheffer: It is regularly moved and seconded that this particular set of dyed samples as described be adopted as the provisional standard samples for fastness to washing on silk of this Association.

. . . The motion was put to a vote and adopted. . . .

President Killheffer: Dr. Olney, didn't you have a certain number of others that you wanted to have adopted as real official standards?

Dr. Olney: Yes, I think I might as well take those up at this time.

Does someone care to make a motion in regard to these standard tests for Fastness to Acid and Alkalies, standard tests for Fastness to Carbonizing, to Rubbing and Crocking, to Sea Water, and the Sun Test which will be mentioned by Mr. Cady later? We recommend that these be adopted by the Association as official methods.

President Killheffer: For the information of those of you who came into the meeting late, I will say that these methods were described before as being those methods which had already been published for a number of years and for which there has been no criticism found, so that it is entirely safe to adopt them now as official standards and standard methods of the Association.

Will someone so move?

Mr. P. H. Scott: I move they be adopted.

. . . The motion was regularly seconded. . . .

President Killheffer: It is regularly moved and seconded that these methods as described be adopted as the official standard methods of the Association.

. . . The motion was put to a vote and carried. . . .

Dr. Olney: The next committee is the Sub-committee on Fastness Tests for Dyed Wool. Mr. Christison, the chairman, is not here. There is quite a little work yet to be done by this committee, particularly in regard to fastness to fulling. The committee is endeavoring to satisfactorily adapt their methods to the Launderometer so that that instrument or machine may be perfectly satisfactory for making this test. For that reason we are not prepared to make any recommendation.

I might say however that it is the purpose of the committee eventually to have a standard set of dyed wool samples similar to these on silk, and a standard set of dyed cotton samples which will answer the same purpose for comparisons.

The next committee is the Sub-committee on Fastness Tests for Dyed Cotton. The chairman, Mr. Moran, is not here. The work of this committee while almost completed has not reached the stage where we care to make recommendations. We hope in another year we may be able to do so.

The next committee is the Sub-Committee on Light Fastness. This committee has done more work probably than any other and has been working a longer time. They have met with greater difficulties I believe than any other committee and I am going to have Mr. Cady tell you about that.

Mr. Cady: *Classification.* Since the last Annual Meeting your Committee has completed the classification of all the light exposures in Series IV, comprising approximately three hundred eighty dyes, some on cotton, some on wool, some on silk. As each dye is shown in both light and dark shades on the same fiber in most cases (in three shades on wool) and as the dark shades invariably show better light fastness than the light shades, it was decided not to classify the fastness of the *dyes* themselves but of the *dyeings*. For example, a 0.2 per cent dyeing of Wool Orange 2 G is placed in Class II, while a 5 per cent dyeing of the same dye is in Class VI, representing an exposure sixteen times as long. This classification list with its accompanying report will probably be published in the AMERICAN DYESTUFF REPORTER some time in January, 1931.

Standards. As a result of correspondence with committees on light fastness in England and Germany, an agreement has been reached to have only one set of standards for all fibers. These standards will be dyed on wool which for various reasons is the most satisfactory fiber for the purpose. While none of the committees has yet

made a complete selection of proper standards, our committee has reached the point where it can recommend, at least tentatively, four dyes which might properly be used as standards for all but the highest grade of fastness. It is planned to make good-sized dyeings of these four dyes on wool, and distribute them among several laboratories for a practical workout. Meanwhile, we are continuing our search for one more standard representing the fastest dyes.

Krais Testing Papers. We have received from Dr. Paul Krais, of the Deutsches Forschungsinstitut for Textilindustrie in Dresden a sheet of specially prepared blue paper devised by him which finds considerable use in Germany as a convenient standard for measuring sunlight. This will be tested thoroughly by our committee.

Abnormal Fading. At a meeting of the Research Committee a few weeks ago it was decided to extend the work of the Committee on Light Fastness so as to include a study of so-called "abnormal fading," where the fastness of one dye is affected (for better or worse) by the presence of another dye in the same combination. This is a relatively new field regarding which little is known at present and only a few isolated examples can be found in the literature. An investigation of this subject may lead to much or little but in any case should be worthwhile.

I will read the recommendation for a standard sun test which the Light Committee published in the Year Book last year and it is appearing again this year. This is the recommendation on which you voted a few minutes ago:

We recommend the following procedure: Samples should be exposed at an angle of forty-five degrees from the horizontal facing due South between nine a.m. and three p.m. on sunny days only, in a cabinet covered with a good grade of window glass approximately one-eighth of an inch thick and open at the sides in such a way as to allow free access of air to the samples. The distance between the samples and the glass shall not be less than one-half inch.

By following these instructions it is possible to obtain practically reproducible sun exposure for we have found that from April to October there is relatively little variation in the sun's fading activity between the hours of nine and three on sunny days.

Dr. Olney: The next committee is the one on Fastness to Perspiration, of which Mr. Christison is Chairman. The experience of this committee indicates the advisability of not accepting tests too quickly as being official. This perspiration test I believe has been published for three years and there has been very little criticism and such criticism as was offered was considered of minor importance. But quite suddenly as you might say there developed criticism which we believe should be taken into consideration and we therefore feel that another year at least should be devoted to a further study of this subject. So that we are not ready to make further recommendations.

Sub-committee on Fastness to Crocking and Stoving, Dr. Meyer, Chairman—I believe he is not here. But we have voted to accept that method as official.

The same is true of the Sub-committee on Fastness to Acids and Alkalies, Mr. Moorhouse, Chairman. We have voted to accept that.

The next committee is of a different character and does not apply to fastness tests. That is the Sub-committee on Research Survey in the Textile Industry from the Standpoint of Textile Chemistry, Dyeing, Printing, Bleaching and Finishing. Mr. Appel, the Chairman, is here; if he cares to make any statement we shall be pleased to hear from him.

Mr. William D. Appel: One of the duties of this Subcommittee is to suggest problems for the consideration of the Research Committee. The newly created United States Institute for Textile Research has under consideration a list of problems several of which come within the scope of the American Association of Textile Chemists and Colorists and for which our Association might well assume responsibility.

A list of these problems together with some others which have been suggested were submitted to the members of the Sub-committee with a request that they list the problems in the order in which they should receive consideration by the Research Committee. Returns from four of the five members of the Sub-committee indicate a decided interest in the following problems:

1. The cause of the shrinkage of wool fabrics (and cotton fabrics).
2. Improvement of fulling methods.
3. Standard method for determining acid or alkali content of textiles.
4. Action of acids on animal and vegetable fibers.
5. Critical survey of the color problems of the textile industry and review of methods which have been proposed for their solution.
6. Isoelectric point of wool as affected by the various processes.

Those problems have all been put up to the United States Institute of Textile Research as broad problems of general interest and we certainly ought to do our share in the solution of them, perhaps to the extent of assuming responsibility for having them solved.

Dr. Olney: The next committee is the Sub-committee on Bibliography of Textile Chemistry, Bleaching, Dyeing and Finishing. Dr. Mullin is the chairman of that committee. He doesn't seem to be in the room at the present moment.

I will say for that committee, last year we published

a list of what was considered the most important books upon those particular subjects. That list has been enlarged and revised and in addition we have published a list of what the committee considered some of the most important articles which appeared in the literature upon these subjects during the year 1929. We believed that this list will be of considerable interest and value to the members of the Association for reference and assistance in studying.

Sub-committee on Methods of Testing Water-proof Textiles. Dr. Harold, the chairman of that committee, I believe is here.

Dr. Jos. F. X. Harold: We have very little of moment to report since the last Year Book appeared, except consultations between Mr. Appel and myself looking to a standardization of testing heavier fabrics than are usually regarded as common textiles, that is, the awning and duck. It is questionable whether the instrument advised in our Year Book of last year is the ideal instrument for these extremely heavy fabrics. The Bureau of Standards is making a very interesting series of tests on a box test for these heavier fabrics and we feel that there will be something very interesting to report in detail during the coming year.

In the last year we have added another member to our committee. These tests as recommended in our Year Book are more or less for determining the permeability of the fabric to water under a slight or increasingly great hydrostatic head. There are some water-proofers who believe that even a fabric that is impermeable under the tests recommended in the Year Book may be well rain resistant, and as there seemed to be some ground for their contention, or at least they seemed to be rather earnest in this contention, we thought the just thing to do was to make a representative of that group a member of our Standards Committee, and we have added the name of Dr. Taylor to our list through the year, Dr. Taylor of the Cravanette Company, so that all sorts of manufacturers with divergent methods will have proper representation.

A number of fabrics treated in the most slipshod way, buttered as we might call it, that is, simply treated with a wax or grease on one side of the fabric, allowing no time for impregnation, are sometimes more successful than those that have been heavily treated by processes that impregnate without clogging the web.

On the other hand, some manufacturers say that they have produced a fabric of such a character that if one wears an overcoat made out of it and lets his arm stick out of an automobile window in a driving rainstorm for a couple of hours, although there will be no clogging of the web, there will be constant resistance to the driving rain. I haven't seen that demonstrated, but I have heard about it.

It is on that account that we have tried to broaden the committee by giving everybody a chance to express themselves.

I had hoped that during the last year there would be some criticisms of the work of the committee and that there would be some goods sent in for test by the committee but either the work has been so good as to be beyond criticism or the members haven't read it or haven't felt sufficiently interested. I hope anybody engaged in the water-proofing business will read these over with much more attention in the coming year and give us the greatest amount of criticism, as we can only hope to grow in that way.

Dr. Olney: The Sub-committee on Vulcanized Rubber Fabrics, Dr. Raphael E. Rupp, Chairman. The chairman is not here but I will say for that committee that they have done considerable work along the line of trying out different methods of determining every minute quantities of metals, particularly copper and manganese, in textile fabrics, and you will find their recommendations in the Year Book.

Sub-committee on Color Standardization, Dr. Scott, Chairman. Dr. Scott is not here but Mr. Appel is also a member of that committee. I do not know that they have any special report to make. There will appear in this Year Book a long bibliography of most of the important articles referring to this subject. Mr. Appel might say just two or three words.

Mr. William D. Appel: I don't believe I have anything to say. We are considering ways and means of bringing to the attention of the members more information about the relative merits of the newer color measuring equipment, but no definite plans have been made as yet.

Dr. Olney: Sub-committee on Standard Methods of Determining Sizing and Finishing Materials in Textile Fabrics Including Silk Weighting, Russell W. Hook, Chairman. He is not here, but I will report for that committee that they have made considerable progress. They have outlined a method which will appear in the Year Book and that method is being tried out by various laboratories on a set of given standard cloths for further criticism and recommendation.

Sub-committee on Shrinkage of Textiles, Howard D. Clayton, Chairman. He is not here.

That committee has been formed recently and has little if anything to report at the present time. You may note that that is one of the subjects which was suggested by the Committee on Research Survey and we trust that during the coming year they will have several reports to make.

Our latest committee is the Sub-committee on Rayon. That is a very active committee at the present time, headed by Mr. B. L. Hathorne, and he may have a few words to say to us at this time.

Mr. B. L. Hathorne: The Committee on Rayon is so new they haven't much to say except that we have organized and are working. We expect to publish next year a really good way of identifying the various Rayons, figuring that the present methods aren't exactly what they might be, and we also expect to determine different constants and publish those, that is, determine what they are. But we really haven't anything definite to report except that we are organized and working.

Dr. Olney: After I listened to that excellent paper of Dr. Draves' this morning it occurred to me that we might well have a sub-committee on the wetting out of textile materials. I think you will all agree that that is an important subject and one that will still warrant considerable study. Dr. Draves has expressed his willingness to serve as chairman of that committee. Of course there is nothing to report now but we hope in another year there will be considerable.

I know Dr. Killheffer is getting uneasy and I am practically through, but I would like to say that this coming year our work in connection with the United States Institute for Textile Research and our endeavor to cooperate with that body will be one of our important activities.

Election of Officers for 1931

President Killheffer: The next business to come before the meeting is the report of the tellers on the election. Mr. Hoppe, are you ready to report?

Mr. C. F. Hoppe: This is the report of the tellers:

Total votes	414
For President:	
P. J. Wood	409
M. Burtt	1
For Vice-President:	
William Cady	343
H. A. Barnes	310
R. D. Sloan	139
R. E. Rose	1
For Treasurer:	
H. R. Davies	402
For Secretary:	
Alex. Morrison	408
For Councillors:	
H. M. Chase	406
R. Culver	406
J. Hacking	1
R. M. Mitchell	1

The officers for the coming year therefore are P. J. Wood, President; William Cady and H. A. Barnes, Vice-Presidents; H. R. Davies, Treasurer; Alex. Morrison, Secretary; and Councillors for a three-year term, H. M. Chase and R. Culver. (Applause)

President Killheffer: We will accept the report of this committee of tellers and discharge them with thanks.

It gives me great pleasure to turn over to my successor the gavel. I accepted the office of President of this Association myself with a great deal of pleasure and I am sure that Mr. "Pinochle" J. Wood (laughter) will accept it with equal pleasure and I hope that he will find it as pleasurable throughout as I have. (Applause)

President-Elect Wood: Dr. Killheffer and Gentlemen: I should like to thank you for the honor you have bestowed upon me, and whilst I appreciate this honor I also realize that it means a great deal of responsibility. You represent here the membership of a large and important national organization. On that account, I feel this to be an honor that you have conferred on me. I also feel it to be an honor because I regard the chemists of the country as the quality men of the textile industry. Anything that you can do to further the aims and objects of our Association I know you will all do.

There are two expressions that I should like to see eliminated from the American language and they are, 'Let George do it," and, "It is not up to me."

Chemists as a rule are men of initiative. They are not men who pass up difficult problems.

We have problems in our Association that need the wholehearted co-operation of every member.

During my administration I only ask you to continue the splendid co-operation that you extended to my predecessor.

Thank you. (Applause)

Have you any report to make Dr. Olney?

Dr. Olney: No.

President-Elect Wood: We will proceed then with our technical program.

. . . The meeting then continued with the technical program for the afternoon. . . .

ANNUAL BANQUET

THE Annual Banquet of the American Association of Textile Chemists and Colorists was held Saturday evening, December 6, 1930, at the Read House, Chattanooga, Tennessee, Mr. R. S. Wheeler, Chairman of the South Central Section, presiding as Toastmaster.

Hon. E. D. Bass, Mayor of Chattanooga, addressed the gathering and extended greetings. (Applause)

Toastmaster Wheeler: I am sure, gentlemen, that in my introduction I didn't say half enough about the Mayor.

We are very fortunate in having with us the Past President of our Association, Dr. E. H. Killheffer. I am sure he needs no introduction to this audience. I shall simply present him. He will reply to the address of welcome. Dr. Killheffer! (The members arose and applauded)

Past President Killheffer: Mr. Chairman, the Honorable Mr. Mayor, and the other gentlemen: That isn't the way I was introduced this afternoon. (Laughter)

I am sure, Your Honor, we appreciate most heartily your very kind words to us and we have, I am sure, appreciated to the full all that has been done for us since we have been here. I am very glad to voice what I know to be the sentiment of all of our members who have been privileged to be here when I say that we have enjoyed ourselves tremendously from the time that we came until now and from what we are told we expect that the enjoyment will continue even beyond our train-time perhaps. Am I right, fellows? (Cheers and applause)

During the day when we had our sessions here I am sure many of us were of the opinion that we were somewhere on a golf course because the water hazards were certainly plentiful about every fourth hole and many of us got into them. (Laughter)

We certainly want to extend the thanks of the Association to the committees who have done so nobly in arranging for our entertainment, which is never a small task, and perhaps never fully appreciated, but we certainly do appreciate it and I think you will see us back here again.

Just a word about what seems now the short time that I have been honored in being permitted to serve as your President. It has been a great honor and I certainly have appreciated it and shall always remember it.

Since coming to that office I have talked on one subject so often and perhaps so long that many of you have tired of it long ago. It has been Research, Research, and still more Research. The object was to try to promote the idea of textile research to the point where it might take some tangible form and actually get started.

Such a development has now taken place in the formation of the United States Institute for Textile Research. When you write out the initial letters of that it looks like the Soviet Republic but I hope it will be different. In this Institute are brought together the interests, we think, of all textile associations, of the many schools devoting themselves to textile education, and all those who have evidenced any interest in the great subject of textile research. The thought has been that while in our own Association we were equipped to handle one particular phase of that work along lines of chemical processing, there are so many phases to the subject as a whole that we need something much broader than our Association. We have however acted, really, as sponsor for this other association.

We have succeeded in interesting the other bodies. The association is now organized as you doubtless know. We were fortunate in getting Dr. Stratton, for many years president of Massachusetts Institute of Technology, to take the presidency of the Institute. Dr. Stratton being now retired, is in a position to devote a great deal of time to it and it certainly takes time.

We hope now there will be a real start made along the line of some fundamental textile research for the textile industry and that our industry here will not wait until the horse is gone before they lock up.

There is a question that we might ask ourselves which will bring this thing home to us quite sharply. That is this question: What if there should be a revolutionary change in processes, textile processes? What would happen to individual textile units if there should be a revolutionary change? You might find that a plant would become almost obsolete in the space of a few days or a week or a month, at any rate, in a time all too short.

That is not inconceivable. It might happen. It has happened in other industries where plants have had to be scrapped because of some revolutionary development that has come about very suddenly. It might happen in most any industry and it may possibly happen in the textile industry. The best insurance against that is just this activity which we now hope will go forward with accelerated speed.

There are all kinds of problems wound up in the textile industry, some of them perhaps rather strange.

Of course we realize that there are some things that just can't be done and perhaps even this research won't help out much in that particular.

Our Association has grown from year to year and I believe now is on a very firm footing. Our membership is constantly increasing. We have I believe within our membership by far the greater number of textile chemists and colorists, dyers, printers, and everyone else connected with the chemical processing of textiles.

There is no reason why this Association should not continue to go forward just as it has done in past years and under the able leadership of our new President, Mr. Wood, I am very sure that it will continue to go forward and that this Association will occupy in an increasing degree the important place that it should in the world of textiles.

I thank you. (Applause)

Mr. A. R. Thompson, Jr.: May I say a few words before you go any further?

Dr. Killheffer has been our President for three years. He has worked untiringly to advance the interests of our Association. He has seen it grow from

just a very few sections to the point where it has eight or nine sections.

I know that he has worked very hard. I know that he appreciates the applause he has received here tonight from his fellow-members. And of course he appreciated the recognition that was given him by one of our entertainers. Whether that is going to be made an official custom, I don't know. Perhaps Mr. Wood will receive the same sort of recognition at the end of his term of office.

However, there is one more thing I would like to see done tonight and that is for this entire group to show their hearty appreciation of all that Dr. Killheffer has done by arising and giving him three good "hip-hip-hoorahs." Let's go, boys! What do you say?

. . . The members arose and gave three rousing cheers to Dr. Killheffer . . . (Applause.)

Toastmaster Wheeler: As you gentlemen know we held an election at this meeting and I now have the honor of presenting to this assembly our new President, P. J. Wood. (The members arose and applauded.)

President-Elect Wood: Mr. Toastmaster, Mr. Mayor, Fellow-Chemists: The reason I am in this position today, if you will pardon my making a personal reference, is because of the efforts of two women and I should like to give them credit for it; my dear old blind mother, four thousand miles away, who taught me to read and write before I went to school, and my wife, who has encouraged me through many discouraging years.

It was a great pleasure to me to be elected by you today to the high office of President of this national association. I only hope that I shall be able to live up to the high responsibility which it entails. I intend to bend every effort toward that end.

I only hope that I shall be a satisfactory successor to the two fine Presidents who have preceded me, Dr. Olney and Dr. Killheffer.

Today during the reading of the reports you will remember that Mr. Davies in the absence of our Secretary reported that we now had 1,335 members. It is not enough. There are more chemists by a great deal than that number represents.

I just want to leave one thought with you. I don't want to make any extended speech. I didn't prepare a speech. I didn't expect to be called upon.

Let every man who is a member of our Association go forth as a salesman for the Association and sell it to the textile chemists who are not now members of our Association. Let us get back those members who are falling away. We know them in our different sections. And we look to the South, gentlemen, for the greatest development of our membership. The textile industry here is growing by leaps and bounds. Let each man appoint himself a special representative, a special salesman.

I only wish you could each one of you be as good a salesman as the man I heard about, naturally a New Yorker, who was the star salesman of the world. He went from job to job, selling more goods, getting more salary, until finally he really thought he was the star salesman of the world. At about this time he decided he would get married. He went to see the girl of his choice and she turned him down. This made him very despondent. He found that, good salesman as he was, he couldn't sell himself. So he went to Brooklyn Bridge and started to climb over the parapet to drown himself when a policeman came along and said, "Hey, what are you doing there?"

He explained to him.

"Well," he said, "just let's walk up and down here on my beat for awhile and we will talk this thing over."

After talking the thing over for twenty minutes, they both jumped over. (Laughter and applause.)

Toastmaster Wheeler: The next number on the program we don't want to jump over. We have things in the Southland that we are proud of, besides our Textile Institute, and one of them is our textile publication. We have with us this evening the editor of one of our most progressive, wide-awake publications in the South, "Cotton," published in Atlanta, Georgia, and I have the pleasure of presenting at this time Mr. Robert W. Philip. (Applause)

Mr. Philip: Mr. Wheeler, ex-President Killheffer, and Members of the Association: The most graceful thing I could do right now would be to sit down and let the next number come on because I know you are going to enjoy it thoroughly. As I came up to the speakers' table and met these distinguished gentlemen I shared the surprise that probably you have as to why I was put up here and felt pretty much in the position of the automobile mechanic down in Florida.

Mr. Henry Ford has some close friends who are about as well known in their respective fields as he is in his, and they were making a trip to Mr. Edison's winter home in Fort Myers one day through the country. One of the headlights blew out late in the evening and they stopped at a small town garage at the side of the road. Mr. Ford went in and asked the mechanic if he had some light bulbs. The mechanic said, "Yes."

Mr. Ford said, "What kind of light bulbs do you have?"

The mechanic said, "Edison Mazda."

"Well," Mr. Ford said, "that is quite a coincidence.

Mr. Thomas A. Edison is out in the car with me."

The mechanic said, "Yeh?"

"Yes," Mr. Ford said, "we want them for a Ford car and, by the way, I am Mr. Henry Ford."

The mechanic said, "Yeh?"

He said, "And I notice there you have a Firestone tire being aired. That too is quite a coincidence because Mr. Harvey Firestone is also out in the car."

The mechanic said, "Yeh?"

As he went out and was putting the bulb in the tail light the late John Burroughs, the naturalist, who as you know wore a long flowing beard down to his waist leaned out of the car, and the mechanic picked up a wrench and said, "Listen here, you tell me you're Santa Claus and I'll knock your block off." (Laughter)

That is about the way I felt when I came into this distinguished gathering. I wouldn't allow them to intrude me on the program if I didn't feel that there was something I could say to you.

There is no need for me to welcome you to the South because that has been most graciously and happily done by Mayor Bass and Mr. Wheeler and by the efforts of the local Entertainment Committee. I know that all of those things have made you feel the genuine spirit in which you are welcome to the South. But I feel that I can bring to you a greeting that is twofold in its nature.

The first greeting I would like to bring you is as a Southerner and, by the way, during the afternoon session one of your distinguished members referred to the Democratic Party as a fortuitous concourse of unrelated prejudices, I believe. (Laughter) We in the South, Mr. Cady, are rather hot-blooded. We are Democratic. And I would like to take this opportunity of replying to that by telling of what happened when one of you New Englanders came down and was talking with one of our mountaineer Democrats, trying to convert him to Republicanism. Finally the Republican said to the mountaineer, "Why are you a Democrat?"

The mountaineer drawled, "Well, my granddaddy was a Democrat. My daddy was a Democrat and by golly I'm a Democrat."

"Well," the Republican said, "on that line of reasoning, if your grandfather had been a horse thief and your father had been a horse thief, what would you have been?"

The mountaineer said, "In that case, I suppose I would have been a New England Republican." (Laughter)

What I shall say also reminds me of the story of the Californian who was down in Georgia in a small town with nothing to do. There was a funeral ceremony being conducted in the church and having nothing else to do he went in. During the ceremony the minister after giving the eulogy about the man who had died paused and said, "Now, if there is anything else that anyone would like to say we will be glad to hear it."

No one got up. Finally the Californian arose and said, "If nobody else has anything to say I would like to tell you about the climate in California." (Laughter)

To those of you who have come down here to Dixie for this meeting I would like to extend as I say a greeting as a Southerner. Those of you who don't live among us, who haven't been down here to see the remarkable transformations that have taken place in the South perhaps don't fully realize the tremendous development that has taken place. And I should like to call to your attention some of the phases of that remarkable and almost unprecedented transition that has occurred in our South in one of whose most charming typically progressive cities you are now meeting.

The New South, once an outpost and now termed the last industrial frontier of the United States, a place where progress, amazing progress in almost every progressive phase of our nation's economic business and industrial life have taken place. If by chance the impressions of some of you visitors are dominated entirely by thoughts of our champions in golf (and we have the supreme one of course), by our champions in tennis (we have one of them), by our champions in football (some of you Yale men possibly realize that we have them) (laughter), by our champions even in the prize ring (we have at least a potential champion, if things work out right) (laughter), we have champions in all of those phases of sport and we are genuinely proud of them.

If you think of us in terms of our resorts, our Georgia and Florida beaches, and our Georgia, Carolina and Tennessee mountains are world-famous, and we are proud of them.

If you think of us as a cordial though somewhat provincial territory, let me bring you greetings in the name of a new South, industrially and commercially minded, a section whose industrial products total more in value than twice the worth of her agricultural products, a South whose tangible resources even within my own short lifetime have grown from around eighteen billion dollars to more than eighty billion dollars. And in spite of what comments you may have heard as to our financial situation right at the present time we are reliably informed that in the Southern banks there are more than ten billion dollars. So I think we are safe for awhile at least.

The greatest factor in this industrial development of course has been the development in the cotton textile industry with which of course you are very closely allied and it is from that industry also that I bring you greetings with sincere feeling as a sort of ambassador without portfolio.

Your interests of course are interlocked with the interests of our industry and as an indication of that I don't know that you realize that the textile mills of North and South Carolina four years ago, the textile mills alone, consumed more than thirty-one and a half million dollars worth of chemicals. So I am very happy to greet you in the name of the Southern textile industry. And in that industry great things have been happening within recent months even, and I am pleased and happy to be able to bring you some good news from that industry.

One development has been an almost unanimous subscription to a voluntary program of reduced working hours in our mills which from a humanitarian standpoint of course is going to be a wonderful thing for the thousands and hundreds of thousands of people who work in the industry. It is also going to have a very wholesome effect from the standpoint of balancing the production of our mills with the demand.

A more recent development has been the almost universal and voluntary subscription to a program looking to the elimination by March 1st of next year of the employment of women and minors under eighteen years of age. And may I say parenthetically that those could hardly be considered children. So many talk of the children in our mills, which of course is not true.

That in addition to its humanitarian effect is also going to have the effect of bringing productive capacity more in line with demand.

In addition to this voluntary regulation of productive capacity the Cotton Textile Institute through its agencies have been producing some active and resultful efforts in the way of extending the uses of cotton and that also will have a wholesome effect upon the condition in the trade.

Let me leave with you a word of considerable cheer in connection with the industry.

Reliable figures show that stocks in the hands of the consumers or customers of the mills are very low and there are virtually no stocks in the hands of the mills themselves. The public consumption of cotton fabrics has been only slightly reduced.

Those factors together with a regulated and intelligent operation from the standpoint of hours is certain to put the industry in a better position and certainly justifies a better tone and feeling that is prevalent in the industry today.

In conclusion let me again on behalf of the South and the South's industries bid you hail and farewell. We are honored by having your meeting down here. We feel that we have come to know you better. We hope that you feel you know us better. And for that privilege we are grateful to you.

Thank you. (Applause)

. . . At this point, upon motion of Dr. C. E. Mullin, regularly seconded, a rising vote of thanks was extended to the officers and committees who arranged the entertainment and meetings . . . (Applause)

. . . At this point, Dr. D. W. Daniel, of Clemson College, South Carolina, addressed the members . . .

. . . The banquet then adjourned . . .

FUTURE MEETINGS OF THE COUNCIL AND RESEARCH COMMITTEES

January 10—Boston.
February 27—New York.
March 20—Boston.
April 17—New York.
May 15—Boston.

AMERICAN DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

BLISS MORRIS JONES
Managing Editor

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Advertising Manager

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Vol. XIX December 22, 1930 No. 22

Wishing You A Merry Christmas and A Happy New Year

LET'S GO TO WORK

DURING the past year very little in the way of pessimistic or optimistic comment has been forthcoming in these columns. Our editorial pages have regularly disregarded all reference to unfortunate business conditions. However, as 1930 draws to a close we feel that a brief mention of such conditions might not be amiss.

When one analyzes the situation, it seems as if pessimism is as large a contributing factor as any to the poor economic conditions of the country at present. Regularly, throughout the year, statements have been made by leaders of the country saying that we were past the worst and would rapidly recover. As early as last February predictions were made that business would be normal "within two months." However, both of these prophecies were overoptimistic, and they have reacted as false hopes usually do, to produce pessimism. So—let's face it. We are in a period of poor business, and having faced it, let's forget about it, and the best way to forget about anything is to go to work—hard!

And, as we see it, pessimism isn't justified. There is every indication that we have reached the bottom of the business backslide, and that 1931 will see us climbing upwards. We support our opinion by the following:

1. The surpluses in the industry are rapidly being used up, and most houses are succeeding in balancing production with sales.
2. Such prices as are declining are slight and no longer drastic—a healthy readjustment condition.
3. Wage levels are being maintained, which is one of the best means for a speedy recovery.
4. Prices have come down until they are more in accord with supply and demand factors.
5. Purchasing power is being built up through savings and economy.
6. Stock prices have gone down and interest has turned away from speculation and turned towards work. Much attention is being given to research.
7. Money rates are lower and the supply of funds available for business operations is ample.
8. Determined aggressive action has replaced the former policy of letting affairs drift.

It is interesting to note that all these factors have always marked the declining phases of former poor business periods.

So—let's drop pessimism from our outlook as one of our New Year's resolutions, and again—let's go to work!

SPARK PLUGS OR CHEMICALS

ANY agency seeks publicity to create good-will. To do this it must educate the consumer as to its aim and purpose. It must convince him that the company serves his needs. A well written advertisement is educational. Its aim is to make good-will by informing the public of the firm's purpose. People are always against what they do not understand, and any industry which is dependent on consumer support, must make that consumer understand as much as possible about the goods to be sold.

Up to the present time a large amount of the advertising done by chemical works and the dyeing and finishing plants, has been in the form of staid announcements that John Doe offers such and such for sale. It seems to be that tradition, conservatism and the fact that these raw materials are remote from public interest, are the reasons for such a method of advertising. The fact remains, however, that these industries will never get the audience they should have until they realize that they have a consumer to educate, even though he may not be the public at large.

An interesting story of how advertising to educate the public has worked out, is told by the experience of a spark plug manufacturer. Of course, his audience was the public at large, but there is a practical application of the story to a manufacturer who produces goods for further manufacturing. For years this spark plug manufacturer had been advertising his products because they gave long service—and business was good. However, there came a time when demand slackened. The manufacturer then changed his advertising policy. He advertised to educate the consumer. All his advertising copy told the workings of a spark plug and told, furthermore, how for better efficiency, it was well to replace the plugs regularly. It was not merely saying that spark plugs should be replaced from time to time; the manufacturer showed just why and when they should. This new policy resulted in the company obtaining a large renewal demand. Moreover, the consumer's knowledge of the product came to be associated with this manufacturer.

After a random glance through any number of pages of the industry's advertising, it is evident that there is still room for improvement. The good advertisements are numerous, but so are the poor ones. The representatives of the poor advertising should stop indulging so much in the vain satisfaction of saying they either make or offer something, with no word of why or wherefore.

EXTRACTORIALS

While consumption has been holding up fairly well, indexes of industrial production show a rate of activity for making goods at around 15 per cent below normal for several months and from 20 to 25 per cent below the peak of 1929. As a result, stocks of goods on hand are gradually being used up, and before long additional production will be needed to supply the demand. Retailers will increase their orders from wholesalers who in turn will start buying from manufacturers and start the machinery of industry moving forward at a more normal rate.—*Business Bulletin.*

Gumption moves the world of business on to new achievements. Gumption and loyalty, when backed up by honest industry, elevate men into the seats of power, and initiative, integrity and wise performance. Keep them there! The weak man imagines that he would do great things if only the power were given him. He doesn't realize that the ability to wisely use power cannot be delivered along with the power. The ability to use power is born of experience in using what we have and we can increase this ability gradually by sustained effort in a given direction.—*Harris-Dibble Bulletin.*

In our zeal for advancement in industry, let us not force out everything else worthwhile, lest we lose some of the things which give us the spirit to want the very progress we enjoy today.—*The Ceramic Age.*

Prior to 1930, imports of coal-tar products exceeded exports, but at present the position is reversed. Benzol, which accounted for more than half of the total coal-tar exports of $14,700,000, recorded an increase of 60 per cent in quantity, to 39,000,000 gallons, and 36 per cent in value, to $8,448,000, for the current nine months. Exports of other crude coal-tar products also improved. —*Commerce Reports.*

The value and importance of the textile research and testing laboratory is again manifested in the announcement that such a laboratory will be added to one of the schools in London, said to be the first so equipped to that area, as a forward step in the scientific selling of British textiles. It is reported that plans are being made to open this laboratory to the whole retail textile trade for testing purposes.—*Textile Maintenance Notes, Dept. of Commerce.*

Book Reviews

Washing, Cleaning and Polishing Materials. *Circular No. 383. Bureau of Standards, 47 pages. 10 cuts. Supt. of Documents.*

This publication discusses briefly the use of water in laundering, pointing out the effects of impurities in water and means for their elimination. A brief description of the general composition of soap, soap-manufacturing processes, and the common varieties of soap products is followed by a short discussion of alkaline cleansers and miscellaneous detergent or laundry aids, such as bleaches, sours, bluing, and starch. Brief discussions are also included on dry-cleaning operations, solvents, dry-cleaning soaps, stain removal, finishing, reclamation of solvent, and elimination of static electricity in dry-cleaning plants. Sections are devoted to furniture and automobile polishes, metal polish, floor wax and polish, polishing cloth, dust cloths, sweeping compounds, and wall-paper cleaner. A list of Government specifications for the products covered, numerous references, and suggested formulas for some items are also given. Recommended specifications are given in the appendix for two grades of laundry soap.

L. A. O.

New Technical Notes for Cleaners and Dyers. *Revised and arranged by Moses H. Goldman, Technical Editor of The National Cleaner and Dyer. Published by The National Cleaner and Dyer, 521 Fifth Avenue, New York City.* 1930. *Pages* 352, *price* $4.00.

This volume is a practical working guide including the best of former volumes of Technical Notes and newer methods and processes, covering Dry Cleaning, Dyeing, Spotting, Pre-Spotting, Wet Cleaning and Bleaching.

This book is an honest effort on the part of the editor and publishers to furnish a more thorough and more detailed education, for the large number of dry cleansers, and garment dyers, who have awakened to an ever-deepening consciousness of a need of a more scientific and technical knowledge of their industry.

Sections are devoted to the following subjects; Chemicals and Their Uses; Care of Solvents; Treating Silks, Velvets, Woolens and Cottons; Handling Celanese, Rayon and Other Synthetic Fabrics; Modern Dry Cleaning Methods; Spotting and Pre-Spotting; Wet Cleaning and Bleaching; Saving Time in the Finishing Process; Dyeing Silks, Fabrics, Woolens and Cottons; Moth-proofing; Cleaning and Dyeing of Furs; Carpet and Rug Cleaning; Cleaning and Dyeing Felt, Straw and Panama Hats; Glove Cleaning and Dyeing; Renovating and Dyeing Leather Goods; Cleaning Upholstery and Auto Interiors; Selection and Care of Equipment.

Mr. Goldman, who is recognized as one of the leading technicians of the industry and who has had a wide experience in textile mills, and with the National

Association of Dyers and Cleaners, and with the Bureau of Standards, has succeeded in bringing together much valuable information on the above subjects. This book should be a valuable addition to the library of every dry cleanser and textile chemist, and would undoubtedly prove a valuable aid in the solution of many of the problems met in their every day work.

L. A. O.

Artificial Organic Pigments and Their Application, by Dr. C. A. Curtis. *Translated from the German "Kunstliche Organische Pigmentfarben" by Ernest Fyleman B. Sc., Ph.D., F.I.C. Pub. Isaac Putman & Sons, 2 West 45th Street, New York City.* 1930. *Pages* 291. *Price* $6.00.

The original text has been carefully revised, the dyestuff tables have been enlarged and adopted to the English market. The author states that the main fields of application are in the varnish and printing industries. This reference is to the paper printing industry as no mention is made in the text of the textile printing industry. Sections of the book are devoted to the following subjects. An introductory consideration of the character of pigments and lakes, their relation to coloring in industry and also includes a classification of the organic pigments according to molecular structure. The second section is devoted to the manufacture of pigments. The third section, which is the largest, goes into considerable detail in regard to the application of pigments with special reference to water-paints, and cements, oil paints and enamels, printing inks, sealing wax, crayons, artists' colors and linoleums.

Pigments and vehicles suitable in each case are given; and in many instances detailed procedures for their application. The fourth section is devoted to patent literature on organic pigments. The fifth section is devoted to the theoretical consideration of various matters concerning pigments, their fastness and coloring power, and this is followed by a short discussion of the analysis of organic dyestuffs. A valuable feature of the book is an appendix of nearly 100 pages which gives a very complete tabulation of the organic dyes of interest in pigment manufacture with patent and literature references, their Colour Index and Schultz numbers, constitution, fastness, uses, etc. In all 544 dyes are described. This book should be of interest to every maker and user of pigment colors.

L. A. O.

An illustrated catalog descriptive of water purifying apparatus as the result of 41 years' experience in the treatment of highly polluted water has just been issued by Hungerford & Terry Inc. of Clayton, N. Y.

The regular quarterly dividend of 75c on the common stock of the Hercules Powder Company was declared recently by the Board of Directors. The dividend is payable to stockholders of record Dec. 12. There are 603,079 shares of common stock outstanding.

The Control of Copper Content of Dyed Fabrics

By Joseph W. Russell
Chief Chemist, Otis Company

AFTER reading the very interesting articles on the determination of copper by Raphael E. Rupp and William C. Smith, published in the September 15th issue of the American Dyestuff Reporter, it occurred to the writer that the experiences of the Otis Company Chemical Laboratory, which has done considerable work in copper determination and control, might be of general interest to the readers of the Reporter.

When the allowance of copper was 0.005% the use of dyestuffs containing a few hundredths of one per cent of copper was reasonably certain to give a copper content below the allowed amount, with enough leeway to include the copper taken up during the various operations. With the lowering of the allowance to 0.002% of copper about a year ago, the problem of the mill chemist became more serious.

During the past two years the dyestuff manufacturers have devoted considerable attention to the production of so-called copper free colors. It is now possible to select colors for practically any shade which will give a copper content in the finished cloth less than 0.002%.

When the method of determination of copper proposed by the Sub-Committee on Rubberized Fabrics was published in the 1929 Year Book by The American Association of Textile Chemists and Colorists it was adopted on account of being more rapid than methods which had been previously considered. It was felt that the method should be given serious consideration on account of being submitted by a committee which had given the subject considerable investigation. The accuracy of the method was confirmed by numerous tests, of which the following is a typical illustration.

Three samples of bleached flannel, cut from the same piece were used. One piece was tested and found to contain 0.0009% of copper. To the other two pieces were added 0.001% and 0.002% of copper, and copper determinations made. The results were as follows:

	Copper Determined	Copper due to addition
Bleached Flannel, no copper added	0.0009%	
Same with 0.001% Cu. added	0.0021%	0.0012%
Same with 0.002% Cu. added	0.0030%	0.0021%

It will be seen that the errors are not large considering the very small amounts of copper present.

After various samples of finished cloth were tested for copper it was found in many instances that the amount determined was higher than would be expected, judging by the amount of copper in the dyestuffs used. All of the chemicals used in dyeing Indanthrene and Sulphur Colors were tested and found to contain only slight traces

of copper, not enough to materially affect the copper content of the dyed yarn or cotton. Samples of cotton cloth and yarn were tested immediately after dyeing, and samples made from the same yarn and cotton were taken from the loom, and after finishing. A very decided increase of copper content was noted as shown by the following typical example:

	Copper
Filling, cotton dyed	0.00054%
Warp, yarn dyed	0.00070%
Cloth from loom	0.00130%
Cloth after wet finishing	0.00160%

Based on the per cent of warp and filling in the cloth the copper in the cloth due to dyeing would amount to 0.00060%. It will be seen, therefore, that there is an increase of 0.0007% taken up by the cloth during the processes after dyeing, including weaving. It will also be seen that 0.0003% of copper is absorbed by the cloth during wet finishing. Further tests indicated that this was almost entirely taken from the dry cans. We feel that in the same manner a large part of the increase between the dyeing and weaving may be due to copper taken mechanically from the slasher cans. In this connection it is well to inform the man in charge of the slashing that he must avoid the use of Copper Sulphate or any sizing preparations containing it.

Our experience has been that the absorption of copper by filter paper is not as serious as it is considered to be by some writers. It is, no doubt, a fact that cellulose absorbs copper from a relatively strong solution. Numerous experiments have demonstrated that there is not a material difference in results when working with the comparatively weak copper solutions used in making determinations of copper in fabrics. The variation has been no greater between duplicate tests, one of which was filtered through paper and one through asbestos, than when both were filtered through paper or both through asbestos. In other words, the error is no greater than the expected error of manipulation when dealing with very small amounts of copper.

The following figures illustrate the above paragraph:

	Filtered through Paper	Filtered through Asbestos
Sample No. 1 Cloth	0.00169%	0.00175%
Sample No. 2 Cloth	0.00129	0.00124
Sample No. 3 Cloth	0.00100	0.00108
Sample No. 4 Yarn	0.00063	0.00058
Sample No. 5 Yarn	0.00050	0.00043

In order to determine whether the asbestos as well as the paper absorbed copper the following tests were made. Standard copper solution was put into a small beaker and put through the entire procedure except digestion of ash, which would be followed in making a determination of copper in a fabric. The amount of copper used was equivalent to 0.002%, based on a 20 gram swatch of cloth. Four tests were run, two being filtered through paper and two through asbestos. The results were as follows:

	Copper Present	Copper Found
Filtered through paper	0.002%	0.00193%
Filtered through paper	0.002%	0.00190%
Filtered through asbestos	0.002%	0.00193%
Filtered through asbestos	0.002%	0.00193%

It will be seen that the amount of copper lost in the determination is five per cent, or less of the amount started with, which is less than the average error to be expected from the method.

The following precautions are recommended to all who are interested in producing a fabric with 0.002% or less of copper:

Only dyestuffs which are practically copper free should be used, and the overseer of the dye house should be supplied with a list of colors which may be used in styles which are required to be copper free. He should also be given a list of colors which must not be used. Every man in the dye house who has anything to do with the dyestuffs should be familiar with these lists. In order that everybody in the plant may be informed all organization sheets, tickets, etc. should carry the words "Copper Free" after the shade number. While to some it may seem unnecessary, it is advisable to test each lot after dyeing, from the loom, and after finishing. A test on the dyed goods is of course necessary. A test on the weave room sample is a protection against the accidental substitution of yarns which are not copper free. In a mill dyeing a large number of shades for different styles this is a possibility. Finally a test of the finished cloth is necessary in order to be sure that copper has not been put into the cloth accidentally or otherwise during the finishing.

Salesmen Name Koch of Dow for President

Fred Koch, Dow Chemical Co., New York, has been nominated for president of the Salesmen's Association of the American Chemical Industry for 1931. Others named by the nominating committee include Ira Vandewater, R. W. Greeff & Co., 1st vice-president, William H. Adkins, 2nd vice-president, R. J. Grant, Noil Chemical & Color Co., 3rd vice-president, and B. J. Gogarty, American Solvents & Chemicals Co., Secretary-Treasurer. E. J. McGuire, Grasselli Chemical Co., and Grant A. Dorland, MacNair-Dorland Co., were nominated for three-year terms as members of the executive committee. Ballots will be mailed to all members at once and the election will close December 29th, the date of the annual Christmas party.

General Dyestuff Corporation have issued a new color card entitled "Rapid Fast Colors in Calico Printing." This new card describes the application of the Rapid Fast Colors available at the present time, and contains a number of printed patterns.

The Action of Hypobromites

(Continued from page 790)

Treatment	Reactivity ratio.
Not mercerized	1.02
Mercerized and allowed to shrink without stretching	1.59
Mercerized and stretched back to 52 inches	1.51
Mercerized and stretched back to 53 inches	1.47
Mercerized and stretched back to 54 inches	1.46
Mercerized and stretched back to 55 inches	1.47

Another interesting observation may be made as regards the above experiment. The cotton yarn was mercerized previous to scouring. When the yarn was scoured first and then mercerized without stretching, the reactivity ratio was higher—1.68. This is a point worth the reflection of yarn mercerizers.

The treatment of cotton with concentrated sulphuric acid is known to have a swelling (parchmentizing) effect, and it would be anticipated that such treatment should increase the reactivity ratio of cotton treated in this manner. This was actually found to be the case, but the effect was largely dependent on the concentration of the acid as the following data show, which relate to the acid treatment of a plain bleached cotton cloth:

Temperature of treatment	Treatment for 2 mins. Reactivity ratio	Treatment for 5 mins. Reactivity ratio
	62.5 % Sulphuric acid.	
20 C.	1.07	1.07
0	1.17	1.19
—10	1.21	1.39
	68.7 % Sulphuric acid.	
20 C.	2.31	2.54
0	2.12	2.27
—10	1.83	2.16

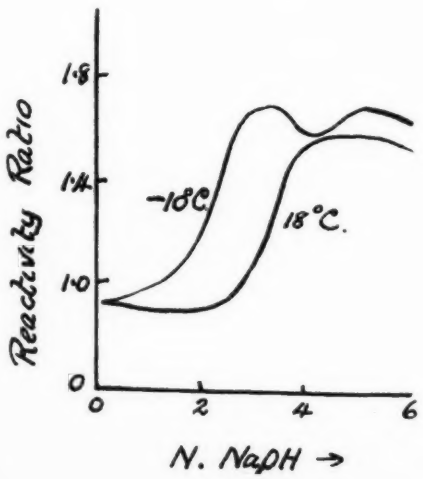

Fig. 5.

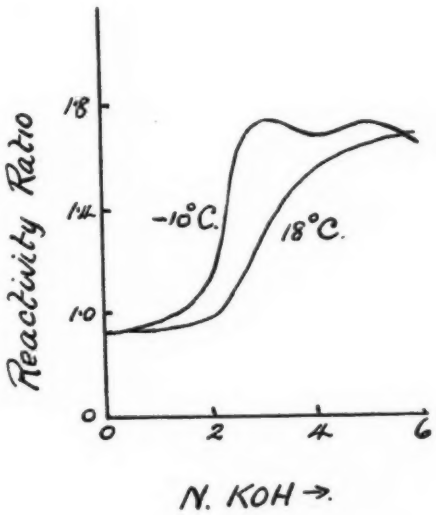

Fig. 6.

The reactivity ratios thus obtained with 68.7% sulphuric acid are very much higher than obtainable by simple mercerization. It would be anticipated that after such treatment cotton would have a very strong affinity for direct dyes and this is indeed true. But from the patent literature it appears that Lilienfeld viscose rayon which undergoes a type of parchmentization with sulphuric acid at the time of its formation has a poor affinity for direct dyes. What is the explanation? Most probably it lies in the fact that at the time of spinning the parchmentization of the rayon is accompanied by a large degree of stretching and it is this which decreases the affinity for dyes. Thus it would appear that it is possible for stretching to have an effect greater than swelling. It would be interesting to know the reactivity ratio of Lilienfeld rayon.

In conclusion attention may be drawn to some further facts concerning mercerization and the effect on the reactivity ratio. From the experiments of Collins and Williams (J. Text. Inst., 1924, *15*, 149) regarding the action of caustic potash and soda on cotton hairs it became apparent that caustic potash exercised less swelling action on cotton than did caustic soda. Similarly the process of A. J. Hall (E. P. 295488) for mercerizing materials containing viscose rayon with caustic potash instead of soda for the purpose of protecting the rayon indicates that potash has less swelling action on this fiber than has soda. Therefore the reactivity ratio of cotton should be increased less when mercerized with potash than with soda. This is shown to be the case in Figs.

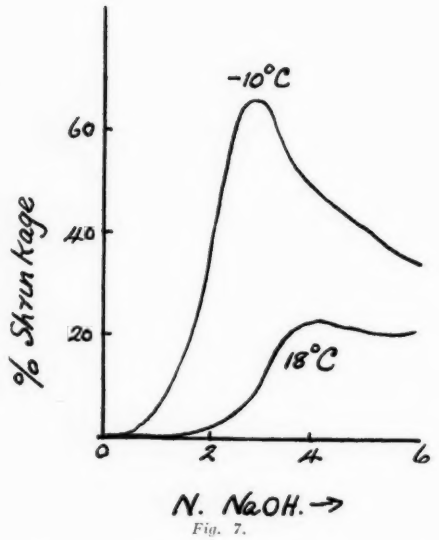

Fig. 7.

5 and 6, where it must be remembered that a N. solution of caustic soda contains 4%, whereas a N. solution of caustic potash contains 5.6% of the alkali. The curves show that both alkalis can produce equal increases of reactivity ratio but for this a higher concentration of potash than soda is required. Further, the curves show that greater swelling occurs as the temperature of the treatment is lowered, and this is strikingly supported by the shrinkage curves in Figs. 7 and 8.

All the above investigations are concerned with cottons or cellulose which has suffered the minimum degradation. Complication will obviously arise when oxidized or acid-tendered cotton is subjected to the test. In the following table is given data which indicates that the hypobromite oxidation tends to modify degraded celluloses such that their Copper Numbers become more nearly equal:

These results indicate that considerable more investigation is required before the reactivity test can be applied to such degraded celluloses.

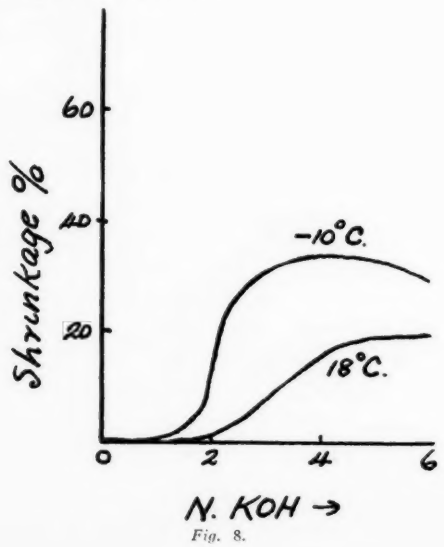

Fig. 8.

After consideration of the various facts outlined above relating to the hypobromite oxidation of cellulose and the reactivity ratio it would appear that the reactivity test can be of considerable service in bleaching and dyeing processes, and also in the manufacture of rayon. In fact it would seem that it is in connection with rayon that its greatest use lies, for most of the difficulties associated with the processing of rayon goods are due to differences in the reactivity of the cellulose of which they are composed.

Cellulose	Copper Numbers after hypobromite oxidation for: 0 hours	½ hour	1 hour	2 hours
Oxidized cotton A	0.81	1.69	1.75	1.68
Oxidized cotton B	1.50	1.70	1.85	1.71
Oxidized cotton C	2.31	1.85	1.89	1.78
Normal scoured cotton	0.05	1.46	1.64	1.54
Acid tendered cotton A	1.05	1.43	1.55	1.52
Acid tendered cotton B	1.54	1.41	1.49	1.49
Acid tendered cotton C	2.78	1.29	1.43	1.39

Last Year a Good One for French Chemical Industry

Last year was a profitable one for the French chemical industry, according to a bulletin just issued by the chemical division of the Commerce Department. Its financial structure was extended, the bulletin shows; profits and dividends were higher, and foreign trade was greater than in 1928. The total foreign trade in chemicals exceeded $246,815,000 in 1929, although the increase in imports which amounted to 13 per cent was double that of exports. Total imports were valued at $110,315,000 and exports at $136,499,000.

The year 1929, the bulletin declares, may be characterized as one of very intensive work in the technical departments of many companies. Every effort was made to keep down production costs, although in some instances it was necessary to enlarge plants, which had become too small for the manufacture of numerous new products.

Although no production figures are available, France is generally considered to hold fourth place in the world's chemical production. French output of chemicals in 1927 was estimated at approximately $357,000,000, and it is probable that the figure for 1929 was somewhat higher.

Supranol Red B R is a new brand of the Supranols offered by the General Dyestuff Corporation. It produces full red shades which are said to have very good fastness to light and washing and excellent fastness to water and salt-water.

The new product, therefore, is of special interest to dyers of yarn for the knitting trade, sweaters, bathing suits, etc. The company states that it has very good affinity for pure and tin weighted silk and gives a pure white discharge with Rongalite. Supranol Red B R dyes wool and silk the same depth and is a valuable product for wool-silk and mixed goods.

Technical Notes from Foreign Sources

Acid Dyestuffs of the Anthraquinone Series

German Patent No. 446,563 (16/*VI*/'27)—*I. G. Farben-Ind. A.-G.*—An extension, in a new direction, of the usefulness of the products of G. P. No. 445,269, in which P-diamino-anthrarufin-disulphonic acids or their N-methyl derivatives are condensed with phenols.

This new group of products is derived from the above by acting upon them with various reagents, for example, by heating with dilute mineral acids or by milder treatment with alkalies. As a result, the phenol residue is shifted into the place of one sulpho group, one hydrogen atom being given up by the phenolic residue; and this hydrogen atom splits off with the sulpho group as free sulphurous acid. Since one sulpho group remains, the products function as acid dyestuffs, and so dye unmordanted wool, in handsome blue tones, which are very fast to light, perspiration, and alkali. They also dye chromed wool excellently.

The general course of the reaction is indicated by structural formulae, and some comments are made upon the solubilities and the absorption-spectra of the products. Two examples are given.

Vat-Dyestuffs of the Anthraquinone Series

German Patent No. 446,932 (23/*VI*/'27)—*I. G. Farben-Ind. A-G.*—Halogenated anthraquinones and amino-anthraquinones condense with suitable agents, which split out halogen acids, to form dianthraquinonyl-amines. These products may be condensed further in some cases to form substances of the carbazole series. For example, G. P. No. 240,080 cites the condensation of a-a'-dianthraquinonyl-amine, by heating with anhydrous aluminium chloride, or with the latter substance in presence of pyridine, to a substance which is stated to be 1-2-7'-8'-diphthaloyl-carbazole; this condensation proceeding more smoothly if each of the anthraquinone residues contains a benzoyl group. In this case, G. P. No. 239,544 states that chlor-sulphonic acid or even concentrated sulphuric acid will bring about closing of the carbazole ring, and is in the cold.

This patent merely claims that these carbazole derivatives, so prepared, form valuable vat dyestuffs, of tones quite different from those of the original substances. The three examples given cover a reddish-brown, a bright yellow-brown, and a deep red-brown, upon cotton.

Vat-Dyestuffs of the Benzanthrone Series

German Patent No. 436,538 (3/*XI*/'26)—*I. G. Farben-Ind. A.-G.* (*addition to G. P. No.* 435,477, *of* 10/*V*/'23.)—In the original patent, nitro-dibenzanthroyls are condensed with alkaline reagents. The present patent extends the procedure to nitro-benzanthrones. Thus, mono-nitro-dibenzanthrone (Indanthrene Black 2B) is fused with alkali to give a new dyestuff dyeing cotton, from a hydrosulphite vat, in grayish-blue to black tones of good fastness. Another example cites the production of a similar product (as to dyeing properties) by fusion of dinitro-dibenzanthrone with caustic. The products are not much unlike the original dyestuffs.

Ultra-violet Radiation in Textile Research

Dr. W. Weltzien—Seide 35, 195 (1930).—The present section of this paper deals with the practical testing of ultra-violet ray generators, with reference to their practicability for textile work. As pointed out, there are really only two types, the mercury vapor lamp and the carbon arc using enriched carbons, which can come into question. Three lamps (of German manufacture) were studied, one the genuine mercury vapor arc type, one of a non-vacuum type, and the third a carbon arc lamp of the sort commonly used for the purpose. Some of W.'s conclusions are as follows:

The mercury vapor arc makes it possible, by use of the filters always provided, to cut off the rays of the visible spectrum, since these rays are less present in proportion to the ultra-violet component than is the case with the carbon arc, however enriched. As to current consumption, at present the carbon arc has the advantage, since several arcs can be managed at the same time on the same circuit. The carbon arc has also, as its great advantage, great intensity, as its disadvantage the presence of much red-ray emanation; the mercury arc furnishes a purer ultra-violet emanation, but it is of lower intensity. Energy consumption favors the mercury arc lamp. In studies of fluorescence, either type is good; only in rare cases there is an advantage on the side of the mercury vapor lamp. The paper closes with a summarization:

1—The fundamental luminescence phenomena are mostly the same with either type.

2—In the carbon arc, the greater intensity of radiation is an advantage, the admixture of the red-ray element may in some cases be a disadvantage.

3—The mercury vapor lamp has as its advantage a more pure ultra-violet emanation; a considerable disadvantage lies in the fact that its intensity of radiation is low (comparatively), and cannot be increased.

4—For study of textile materials, especially that of spots upon goods, the greater intensity and the wider field of vision recommend the carbon arc type, but its use is in doubtful cases to be supplemented by that of the mercury vapor lamp.

A.A.T.C.C. Receives Grant from Textile Foundation

The Textile Foundation at a meeting of its directors, December 4, authorized various organizations to continue work already started or to begin investigations in line with the statement which follows in full text.

The Textile Foundation, organized last June, under act of Congress for "economic and scientific research for the benefit of the textile industries and their allied branches," held a meeting of the board of directors December 4 in the office of Secretary of Commerce Lamont. Those present were: Franklin W. Hobbs, chairman, president, Arlington Mills, Boston, Mass.; Stuart W. Cramer, Cramerton Mills, Cramerton, N. C.; Henry B. Thompson, president, United States Finishing Co., New York City; Secretary Lamont.

The directors considered at length suggestions for work that might be undertaken. Amongst the many projects put forward they concluded to authorize the following:

1. To request the United States Institute for Textile Research to assemble data concerning the various research and other organizations now working on textile problems, the character and scope of such work, and the results to date.

2. To request the American Association of Textile Chemists and Colorists to continue and extend its work on color, relating to textile fabrics. Henry B. Thompson was authorized to discuss with that association the details and scope of the undertaking.

3. The Smithsonian Institution of Washington was authorized to complete its work in compiling a glossary or dictionary of textile materials.

4. The directors were impressed with the necessity of studying certain aspects of the distribution of textiles and Stuart W. Cramer was authorized to confer with the National Industrial Conference Board concerning a proposed preliminary study intended to bring forth, amongst other things, the general work already done in this field, and a plan for a major study.

The directors feel that the results of such preliminary study will place the Foundation in a much better position to decide on the advisability and scope of a more exhaustive inquiry into this important phase of the textile industry.

Model of Finishing Plant

State College Textile School, Raleigh, N. C., has received an electrically operated cabinet from Mr. Wardlaw, of Lockwood Greene Engineers, Incorporated, Spartanburg, South Carolina. The cabinet consists of a large frame, the glass front of which is painted to represent a cross-cut section of a bleaching and finishing plant. By a unique method of revolving cylinders which are electrically illuminated, the cloth appears to be in motion and is realistic, serving to explain clearly the operation of the various machines.

Germany's exports of dyes registered a decline to 21,028 metric tons, valued at 94,912,000 marks ($22,600,000) during the first half of 1930, from the 25,222 metric tons, worth 111,305,000 marks ($26,500,000) sold abroad during the same period of 1929. Aniline dyes—which are the largest group of these exports—accounted for about two and a half million dollars of the $4,000,000 decline in the total German exports of dyes.

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CHEMIST-EXECUTIVE AVAILABLE

Textile Chemist with twenty-two years' practical experience. Graduate Lowell Textile Institute. Four years instructor in Chemistry and Dyeing. Three years theoretical and practical experience in Peroxide Bleaching. Fifteen years in charge of chemical work in large textile plant. Experienced in purchase of dyes and chemicals. Excellent analyst, and one who can interpret results.

Would consider position as technical advisor to chemical or dyestuff executive. Address: Classified Box No. 638, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

RESEARCH CHEMIST WANTED

Research Chemist wanted—must have experience in research and manufacture of dyes for Cellulose Acetate Rayon. State qualifications and references. Address: Classified Box No. 656, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED

BRITISH CHEMIST, 35, experienced in large scale production of Mineral Khaki, seeks situation in America or Canada. Address: Classified Box No. 655, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED

Dyestuff Salesman with many years of Sales and Laboratory experience is desirous of a suitable position with manufacturing concern. Advertiser has an extensive personal connection in various States and can give first-class references. Address: Classified Box No. 657, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.